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CHAPTER-1

BASIC CONCEPT OF DICISION MAKING

Question : 1

Newly started company (NSC) Ltd is a small specialist manufacturer of electronic components and much of its output is used by the makers of aircraft for both civil and military purposes. One of the few aircraft manufacturers has offered a contract to NSC for the supply, over the next twelve months, of 400 identical components at Rs. 145 each.

The data relating to the production of each component is as follows –

A. Material requirements:

- Material M: 3 units. This is in continuous use by NSC. Presently 100 units are in stock at a book value of Rs. 4.70 per unit. Future purchases will cost Rs. 5.50 per unit
- Material P: 2 units. Presently 1,200 units of material P are held in stock. The original cost of P was Rs. 4.30 per unit and the current cost is Rs. 5.40 per unit. But as the material has not been required for the last two years, it has been written down to Rs. 1.50 per unit scrap value. The only foreseeable alternative use of P is as a substitute for material PX4 (in current use) but this would involve further processing costs of Rs. 1.60 per unit. The current cost of material PX4 is Rs. 3.60 per unit.
- Part No. 678 – 1 units: it is estimated that this could be bought for Rs. 50 each

B. labour requirements: each component would require five hours of skilled labour and five hours of semi-skilled labour. An employee possessing the necessary skills is available and is currently paid Rs. 5 per hour. A replacement would however, have to be obtained at a rate of Rs. 4 per hour for the work which would otherwise be done by the skilled employee. The current rate of semi-skilled work, is Rs. 3 per hour and an additional employee could be appointed for this work.

C. Overheads : NSC absorbs overhead by a machine rate, currently Rs. 20 per hour of which Rs. 7 is variable. If this contract is undertaken it is estimated that fixed costs will increase for the duration of the contract by Rs. 3,200. Spare machine capacity is available and each component would require four machine hours

Required:

1. State whether or not the contract should be accepted, with appropriate figures and assumptions.
2. List three other factors which management ought to consider and which may influence their decision.
3. What would be the relevant costs of material P if only 200 units (instead of 1,200 units) are presently in stock? Will this affect your decision in (a) above?

Answer : Net Profit Rs. 1,400

Question : 2

Sweeties & Co. has offered Sweet-Eats & Best- items (SEBI) LTD. An exclusive contract to supply their chain of general stores with packs of toffees, chocolates and mints for 50 weeks. The accountant of SEBI has prepared an estimate on the basis of which he has advised that the contract should not be accepted at the price offered. His estimate was as follows:

Particular		Rs.	Rs.
Materials:	Toffees in stock at original cost	5,000	
	Chocolates already ordered, at contract cost	6,000	
	Mints to be ordered, at current price	10,000	21,000
Labour:	Four skilled-weekly wage Rs. 90	18,000	
	Four un-skilled weekly wage Rs. 50	10,000	
	One supervisor- half of available time	4,000	32,000
Overheads:	Depreciation	11,000	

	General	36,000	47,000
Total costs			1,00,000
Price offered, Ex-works			65,000
Loss			35,000

The accountant also provides the following information –

1. The toffees in stock remain from a trial batch produced for a retail confectionery company that proved to be unattractive to SEBI's usual customers. They could be repackaged at a cost of Rs. 900 and used to satisfy an order from another customer instead of buying in fresh supplies for Rs. 4,500. Otherwise there appears to be no alternative use for them.
2. The chocolates on order represent the delivery on a contract placed several months ago. They could be sold readily for a net Rs. 7,000 after meeting all further cost..
3. The skilled workers would be transferred from other work where each would be replaced by two additional unskilled trainee workers, who would each be paid Rs. 48 per week. The unskilled workers needed for the new contract would be an addition to the workforce.
4. The supervisor undertakes various tasks in the factory and his pay and continuity of employment will not be affected by the new contract. If it is taken, and he had to devote half of his time to it, SEBI will have to hire temporary clerical assistance at Rs. 50 per week.
5. The equipment that would be used on the contract was bought five years ago for Rs. 110,000 and was expected to last for ten years. It is now obsolete. Arrangements have already been started for it to be sold now for scrap for Rs. 5000 but they can be stopped. It will be valueless in one year's time.
6. The general OH, which are allocated at 200% of skilled labour, are all fixed costs over wide variations in output.

In the light of the information given above, comment upon the advice given by the accountant indicating with reasons whether the contract should be accepted.

Answer : Net Operating Profit = 7700

Question : 3

You have received a request from King Corporation to provide a quotation for the manufacture of a specialized piece of equipment. This would be a one off order, in excess of normal budgeted production. The following cost estimate has already been prepared-

Particulars			Note	In Rs.
Direct Materials	Steel	10 sq.m at Rs. 5 per sq.m	1	50
	Brass fittings		2	20
Direct Labour	Skilled	25 hours at Rs. 8 per hour	3	200
	Semi – skilled	10 hours at Rs. 5 per hour	4	50
Overheads		35 hours at Rs. 10 per hour	5	350
Estimating Time			6	100
	Production			770
	Administrative Overhead	At 20% of Production Cost	7	154
	Total Cost			924
	Profit	At 25% of Total Cost	8	231
	Selling Price			1,155

Notes:

1. The steel is regularly used, and has a current stock value of Rs. 5 per square meter. There are currently 100 square meters in stock. The steel is readily available at a price of Rs 5.50 per square meter.

2. The brass fittings would have to be bought specifically for this job, a supplier has quoted Rs. 20 for the fittings required
3. The skilled labour is currently employed by your company and paid at a rate of Rs. 8 per hour. If this job were undertaken it would be necessary either to work 25 hours overtime which would be paid at time plus one half or to reduce production of another product which currently earns a contribution of Rs. 13 per hour
4. The semi skilled labour currently has sufficient paid idle time to be able to complete this work.
5. The over head absorption rate includes power costs which are directly related to machine usage. If this job were undertaken, it is estimated that the machine time required would be ten hour, the machine incurs power costs of Rs. 2 per hour. There are no other overhead costs specifically identified with this job.
6. The cost of the estimating time is that attributed to the four hours taken by the engineer to analyse the drawings and determine the cost estimate given above.
7. It is the policy of the company to add 20% on to the production cost as an allowance against administration costs associated with the jobs accepted.
8. This is the standard profit added by your company as part of its pricing policy.

You are required to:

- Prepare on a relevant cost basis, the lowest cost estimate that could be used as the basis for quotation.
- There may be a possibility of repeat orders from King Corporation which would occupy part of the normal production capacity. What factors need to be considered before quoting for this order?

Answer : Total Relevant Cost = 395

Question : 4

Johnson trades as a chandler at the Savoy Marina. His profit in this business during the last year was Rs. 12,000. Johnson also undertakes occasional contracts to build pleasure cruisers, and is considering the price at which to bid for the contract to build the "Royal Pleasure" for Mr. Bucknor, delivery to be in one year's time. He has no other contract in hand, or under consideration, for at least the next few months.

Johnson expects that if he undertakes the contract he would devote one-quarter of his time to it. To facilitate this he would employ G. Harrison, an unqualified practitioner, to undertake his book-keeping and other paper work, at a cost of Rs. 2,000.

He would also have to employ on the contract one supervisor at a cost of Rs. 11,000 and two craftsmen at a cost of Rs. 8,800 each; these costs include Johnson's normal apportionment of the fixed overheads of his business at the rate of 10% of labour cost.

During spells of bad weather one of the craftsmen could be employed for the equivalent of up to three months full time during the winter in maintenance and painting work in the chandler's business. He would use materials costing Rs. 1,000. Johnson already has two inclusive quotations from jobbing builders for this maintenance and painting work, one for Rs. 2,500 and the other for Rs. 3,500, the work to start immediately.

The equipment that would be used on the Royal Pleasure contract was bought nine years ago for Rs. 21,000. Depreciation has been written off on a straight-line basis, assuming a ten-year life and a

scrap value of Rs. 1000. The current replacement cost of similar new equipment is Rs. 60,000, and is expected to be Rs. 66,000 in one year's time. Johnson has recently been offered Rs. 6,000 for the equipment, and considers that in a year's time he would have little difficulty in obtaining Rs. 3,000 for it. The plant is useful to Johnson only for contract work.

In order to build the Royal Pleasure, Johnson will need six types of material, as follows-

Material Code	In Stock	Needed for the Contract	Purchase Price of stock	Current Purchase Price	Current Resale Price
A	100	1,000	1.10	3.00	2.00
B	1,100	1,000	2.00	0.90	1.00
C	-	100	-	6.00	-
D	100	200	4.00	3.00	2.00
E	50,000	5000	0.18	0.20	0.25
F	1,000	3000	0.90	2.00	1.00

Material B and E are sold regularly in Johnson's business. Material A could be sold to a local sculptor, if not used for the contract. Materials A and E can be used for other purposes, such as property maintenance. Johnson has no other use for materials D and F, the stocks of which are obsolete.

The Royal Pleasure would be built in a yard held on a lease with four years remaining at a fixed annual rental of Rs. 5,000. It would occupy half of this yard, which is useful to Johnson only for contract work. Johnson also anticipates that direct expenses, other than those noted above, would be Rs. 6,500.

Johnson has recently been offered a one-year appointment at a fee of Rs. 15,000 to manage a boat-building firm. If he accepted the offer he would be unable to take on the contract to build Royal Pleasure, or any other contract. He would have to employ a manager to run his own business at an annual cost (including fidelity insurance) of Rs. 10,000, and would incur additional personal living costs of Rs. 2,000.

Your are required :

- To calculate the price at which Johnson should be willing to take on the contract in order to break even, based exclusively on the information given above;
- To set out any further considerations which you think that Johnson should take into account in setting the price at which he would tender for the contract.

Answer : Total Relevant Cost Rs. 53,000

Question : 5

"At Your service" (AYS) is a large company in the civil engineering industry with its corporate office in Chennai. It undertakes contracts anywhere within the state of Tamilnadu.

The company had bid for a job in Location A and its quotation had been accepted at Rs. 2,88,000. Work is due to begin in March. However, AYS has also been asked to undertake a contract in Location B. The price offered for this contract is Rs. 3,52,000. Both locations A and B are within the State of Tamilnadu.

However, both contracts cannot be taken simultaneously because of constraints on staff site management personnel and on plant available. An escape clause enables the company to withdraw from Location A contract, provided notice is given before the end of November and an agreed penalty of Rs. 28,000 is paid.

The following estimates have been submitted by the Company's quantity surveyor:

Cost estimates		Location A	Location B
Materials:	In stock at original cost, Material X	21,600	
	In stock at original cost, Material Y		24,800
	Firm orders placed at original cost, Material X	30,400	
	Not yet ordered – current cost, Material X	60,000	
	Not yet ordered – current cost, Material Z		71,200
Labour	Hired Locally	86,000	110,000
	Site Management	34,000	34,000
	Staff Accommodation and Travel for Site Management	6,800	5,600
	Plant on site – depreciation	9,600	12,800
	Interest on Capital, 8%	5,120	6,400
	Total Local Contract Costs	253,520	264,800
	Corporate Office Costs allocated at rate of 5% on total contract costs	12,676	13,240
Total Costs		266,196	278,040
Contract Price		288,000	352,000
Estimated Profit		21,804	73,960

Notes:

1. X, Y and Z are three building materials. Material X is not in common use and would not realize much money if re-sold; however, it could be used on other contracts but only as a substitute for another material currently quoted at 10% less than the original cost of X. The price of Y, a material in common use, has doubled since it was purchased; its net realizable value if re-sold would be its new price less 15% to cover disposal costs. Alternatively it could be kept for use on other contracts in the following financial year.
2. With the construction industry not yet recovered from the recent recession, the company is confident that manual labour, both skilled and unskilled, could be hire locally on a subcontracting basis to meet the needs of each of the contracts.
3. The plant which would be needed for Location B contract has been owned for some years and Rs. 12,800 is the year's depreciation on a straight-line basis. If location A contract is undertaken, less plant will be required but the surplus plant will be hired out for the period of the contract at a rental of Rs. 6,000
4. It is the company's policy to charge all contracts with notional interest at 8% on estimated working capital involved in contracts. Progress payments would be receivable from the contractee.
5. Salaries and general costs of operating the small headquarters amount to about Rs. 1,08,000 each year. There are usually ten contracts being supervised at the same time.
6. Each of the two contracts is expected to last for march to February which, coincidentally, is the company's financial year.
7. Site Management is treated as fixed cost.

You are required, as the management accountant to the company-

- To present comparative statements to show the net benefit to the company of undertaking the more advantageous of the two contracts;
- To explain the reasoning behind the inclusion in (or omission from) your comparative financial statements, of each item given in the cost estimates and the notes relating thereto.

Answer : Relevant Net Profit : A = 94400 B = 65280

Question : 6

A research project, which to date has cost the WHY company Rs. 150,000 is under review. It is anticipated that, should the project be allowed to proceed, it will be completed in approximately one year when the results would be sold to a government agency for Rs. 3 Lakhs.

The following are the additional expenses, estimated by the Project Manager, to complete the work.

- a. Materials- Rs. 60,000; This materials, which has just been received, is extremely toxic and if not used on the project would have to be disposed of by special means, at a cost of Rs. 5,000.
- b. Labour- Rs. 40,000. The men are highly skilled and very difficult to recruit. They were transferred to the project from a production department. At a recent Board meeting, the Works Director claimed that if the men were returned to him he could earn the company each year Rs. 1,50,000 extra sales. The accountant has calculated that the prime cost of those sales would be Rs. 1,00,000 and the overhead absorbed (all fixed) would amount to Rs. 20,000.
- c. Research staff to be paid- Rs. 60,000. A decision has already been taken that this will be the last major research undertaken and consequently when work on the project ceases the staff involved will be made redundant. Redundancy and severance pay have been estimated at Rs. 25,000.
- d. Consultancy – Rs. 45,000. If the research is not continued, the consultancy contract can be cancelled by paying Rs. 15,000 as damages.
- e. Share of general administration services – Rs. 35,000. The Project manager is not very sure what is included in this expense. He knows, however, that the accounts staff charge similar amounts every year to each department.

Advise the Project Manager whether the project should be allowed to proceed.

Answer : Revenue = Rs. 3,00,000; Relevant Costs = (5,000) + 40,000 + 50,000 + 30,000 = Rs. 1,75,000. Net Benefit = Rs. 1,25,000; Project may be allowed to proceed.

Question : 7

A company had been making a machine to order for a customer, but the customer has since gone into liquidation, and there is no prospect that any money will be obtained from the winding up of the company.

Costs incurred to date in manufacturing the machine are Rs. 50,000 and progress payments of Rs. 15,000 have been received from the customer prior to the liquidation.

The sales department has found another company willing to buy the machine for Rs. 34,000 once it has been completed. To complete the work, the following costs would be incurred.

- Materials – These have been bought at a cost of Rs. 6,000. They have no other use, and if the machine is not finished, they would be sold for scrap for Rs. 2,000.
- Further Labour Costs would be Rs. 8,000. Labour is in short supply, and if the machine is not finished, the work force could be switched to another job, which would earn Rs. 30,000 in revenue, and incur direct costs (not including direct labour), of Rs. 12,000 and absorbed fixed overheads of Rs. 8,000.
- Consultancy Fees Rs. 4,000. If the work is not completed, the consultant's contract would be cancelled at a cost of Rs. 1,500.
- General overheads of Rs. 8,000 would be added to the cost of the additional work.

Should the new customer's offer be accepted? Prepare a statement showing the economics of the proposition.

Note: Labour cost of Rs. 8,000 would be paid if the machine is completed.

Labour cost of Rs. 8,000 would be paid if we do the under job by utilizing such labour and we have to incurred material cost Rs. 12,000 so the contribution from utilizing such labour in the another job would be sale Rs. 30,000 – direct material cost Rs. 12,000 – direct labour cost Rs. 8,000 = Rs. 10,000. Absorb fixed overhead are always irrelevant.

Answer : Acceptance of offer would result in additional profit of Rs. 11,500.

Question : 8

A small contractor has been asked to quote for a contract, which is larger than he would normally consider. The contractor would like to obtain the job as he does have surplus capacity. The estimating department has spent 200 hours in preparing drawings and the following cost estimate.

The following notes may be relevant:

		Rs.
Direct Materials		
3000 Units of X at Rs. 10 (original cost)	See note 1	30000
100 units of Y (charged out using FIFO)	See note 2	
50 units at Rs. 100	Rs. 5000	
50 units at Rs. 125	Rs. 6250	11250
Direct Material to be bought in :	See note 3	12000
Direct Labour		
Skilled Staff (2700 hours at Rs. 5 per hour)	See note 4	13600
Trainees (1250 hours at Rs. 2 per hour)	See note 5	2500
Depreciation on curing press:	See note 6	
Annual depreciation (Straight Line) Rs. 12,000		1000
Subcontract work	See note 7	20000
Supervisory staff	See note 8	6150
Estimating and design department:	See note 9	
200 hours at Rs. 10 per hour	Rs. 2000	
Overtime premium for 50 hours	Rs. 500	2500
Total of Costs as above		99000
Administration overhead at 5% of above costs	See not 10	4950
Grand Total		103950

1. A sufficient stock of raw material X is held in the stores. It is the residue of a quantity bought some 10 years ago. If this stock is not used on the prospective contract it is unlikely that it will be used in the foreseeable future. The net resale value is Rs. 20,000.
2. Material Y is regularly is used by the contractor on a variety of jobs. The current replacement cost of the material is Rs. 130 per unit.
3. This is the estimated cost of the required material.
4. Staff are paid on a time basis for a 40- hour week. The labour hour rate includes a charge of 100% of the wage rate to cover labour related overhead costs. It is estimated that, at the current level of operations, 80% of the overheads are variable. it is considered that one extra worker will be required temporarily for 3 months if the contract is obtained. His salary of s. 100 per week (and the associated amount of labour related overhead expenses) is included in the estimate of Rs. 13600.
5. The contractor hires trainees on hourly basis. Any number of trainees can be hired any time.
6. The Curing press is normally fully occupied. If it is not being used by the contractor's own workforce it is being hired out at Rs. 500 per week.
7. This is the estimated cost for the work.

8. It is not considered that it would be necessary to employ any additional supervisory staff. The estimated cost of Rs. 6150 includes an allowance of Rs 1000 for overtime, which may be necessary to pay to Supervisors.
9. The expenses of this department is predominantly fixed but the overtime payments were specially incurred to get the drawings and plans out in time.
10. The administrative expense is a fixed cost. This is the established method of allocating the cost of specific contracts.

It is considered that any quotation higher than Rs. 1,00,000 will be unsuccessful. You are required to :

- Prepare a revised cost estimate using an opportunity cost approach and state whether it is possible to quote less than Rs. 1,00,000.
- Comment on the use of opportunity cost for (a) Decision Making and (b) Cost Control purposes.

Answer: Cost X = 20,000; Y = 13,000, Direct Material = 12,000, Labour = 12,150, Extra worker = 1,170, Trainees = 2,500, Press = 2,000, Sub Contracts = 20,000, Supervision = 1,000.

Question : 9

Assembly Elections are round the corner and you are management accountant of publishing and printing company, which has been asked to quote by a prominent political party (expected to sweep the elections) for the printing of its election manifesto. The work would be carried out in addition to normal work of the company. Because of existing commitments, some weekend working would be required to complete the printing of the manifesto. A trainee accountant has produced the following cost estimate based upon the resources required as specified by the Production manager.

Direct Materials	– Paper(book value)	50,000
	- Inks (Purchase price)	24,000
	- Skilled 250 hrs. at Rs. 40	10,000
	- Unskilled 100 hrs. at Rs. 35	3,500
Variable Overheads	350 hrs. at Rs. 40	14,000
Printing Press Depreciation	200 hrs. at Rs. 25	5,000
Fixed Production Costs	350 hrs. at Rs. 60	21,000
Estimating Department Costs		4,000
		1,31,500

You are aware that considerable publicity and other future benefits could be obtained for the company if you are able to win this order and the price quoted must be very competitive.

The following notes are relevant to the cost estimate above-

1. The paper to be used is currently in stock at a value of Rs. 50000. It is of a special colour and has not been used for some time. The replacement price of the paper is Rs. 80000, whilst the scrap value of that in stock is Rs. 25000. The production manager does not foresee any alternative use for the paper if it is not used for the manifesto.
2. The Inks required are not held in stock. They would have to be purchased in bulk at a cost of Rs. 30000. 80% of the ink purchased would be used in printing the manifesto. No other use is foreseen for the remainder.

3. Skilled direct labour is in short supply, and to accommodate the printing of the manifesto, 50% of the time required would be worked at weekends for which a premium of 25% above the normal hourly rate is paid. The normal hourly rate is Rs. 40 per hour.
4. Unskilled labour is presently under – utilised, and at present 200 hours per week is recorded as idle time. If the printing work were carried out at a weekend, 25 unskilled labourers would be given two hours time off (for which they would be paid) in lieu of each hour worked.
5. Variable overhead represents the cost of operating the printing press and binding machines
6. When not being used by the company, the printing press is hired to outside companies for Rs. 60 per hour. This earns a contribution of Rs. 30 per hour. There is unlimited demand for this facility.
7. Fixed production costs are absorbed by the units produced, using an hourly rate based on budgeted activity.
8. The cost of the estimating department represents time spent in discussions with the political party liaison committee officials concerning the printing of its manifesto.

Prepare a revised cost estimate using the opportunity cost approach, showing clearly the minimum price that the company should accept for the order. Give reasons for each resource valuation in your cost estimate.

Answer : Paper – Rs. 25,000; Inks – Rs. 30,000; Skilled Labour – Rs. 11,250; Unskilled Labour – Nil; VOH – Rs. 14,000; Depreciation – Nil; Contribution Loss – Rs. 6,000; Total = Rs. 86,250

Question : 10

TOUCHSTONE Ltd had nearly completed a specialized piece of capital equipment when it discovered that its customer had gone out of business. After searches, two other possible customers LAUREL and HARDY were found who might be interested in the equipment subject to certain modifications being carried out.

LAUREL wanted the equipment to be completed to its original specification and then certain extra features to be added. HARDY wanted the equipment in its present condition but without its control mechanism and with certain modifications. The costs of these additions and modifications were:

Party	Laurel	Hardy
Direct Materials (at cost)	Rs. 1,400	Rs. 350
Direct labour – Dept. A	1 man for 3 weeks	--
Direct labour – Dept. B	2 men for 5 weeks	1 man for 3 weeks
Direct Labour – Dept. C	2 men for 8 weeks	1 man for 5 weeks
Variable Overhead	15% of direct wages	15% of direct wages
Special Delivery Charge	Rs. 1,700	Rs. 450

Fixed production overhead is absorbed by TOUCHSTONE as follows:

Department A	120% of direct wages
Department B	80% of direct wages
Department C	40% of direct wages

The cost of the equipment as originally estimated and incurred so far were: (in Rs.)

	Original quotation	Work done so far	Work yet to be done
Direct materials	26,150	21,490	4,685
Direct wages	15,000	13,400	2,100
Overhead:	-	-	-
Variable	2,250	2,010	315
Fixed production	12,500	10,500	2,400

Fixed Selling & administration	2,500	2,100	400
	58,400	49,500	9,900

The price to the original customer allowed for a profit margin of 20% on selling price. An advance payment of 15% of the price had been received when the order had been confirmed.

The following information is related to the possible conversions:

1. Direct materials for the additions for LAUREL would need to be bought from suppliers, but those for modifications for HARDY are in stock and, if not used For HARDY, would be used on another contract in place of materials that would now cost Rs. 750/-
2. The wage rate of Department A is Rs. 140 per man per week. This department is slack at present but, to ensure the availability of skilled personnel, it must keep three men on its payroll even though the current and projected load for the next few months is only 50% of capacity.
3. Department B is working normally and its wages rate is Rs. 120 per man per week.
4. Department C is extremely busy. Its wage rate is Rs. 100 per man per week and it is currently yielding a contribution to overhead and profit of Rs. 3.20 per Rs. 1 of direct labour.
5. If the work for either Laurel or Hardy is undertaken, supervising overtime of Rs. 500 and Rs. 350 respectively would be incurred. Such costs are normally charged to fixed production overhead.
6. The cost of the control mechanism that Hardy does not require is Rs. 4,500. If taken out (at a cost of 1 man-week's work in Department B), it could be used on another contract in place of a different mechanism which could be bought for Rs. 3,500.

If neither of the conversions is carried out, some of the material in the original equipment could be used on another contract in place of materials that would have cost Rs. 4,000, but would need 2 man-weeks of work in Department B to make them suitable. The remaining materials would realize Rs. 3,800 as scrap. The drawings for the equipment, which would normally be included in the selling price, could be sold for Rs. 500.

- (a) Ascertain the minimum price that the company should accept from HARDY for the converted machine;
- (b) Determine the minimum price at which it would be more advantageous to sell to LAUREL if the company received an offer of Rs. 18,000 for the converted machine from HARDY. Show working clearly.

Answer : Relevant Cost of Laurel = Rs. 27,127 and for hardy = Rs. 8,801; Laurel will be advantageous only if his price is above Rs. 36,326

Question : 11

Goner Co, has an inventory of 5,000 units of a product left over from last year's production. This model is no longer in demand. It is possible to sell these at reduced price through the normal distribution channels. The other alternative is to ask someone to take them on 'as is where' basis. The latter alternative will cost the company Rs. 5,000

The company produced 2,40,000 units of the product last year, then the unit costs were as under:

Particular	Variable Cost	Fixed Cost	Total Cost
Manufacturing	6.00	1.00	7.00

Selling & Distribution	3.00	1.50	4.50
		Total	11.50
		Selling Price	14.00

Should the company scrap the items or sell them at a reduced price? If you suggest latter, what minimum price would you recommend?

Answer : if nothing is realizable, the items should be sold on “as is where is basis” since cost incurred is Rs. 1 per unit as opposed to Rs. 3 per unit under sale through normal channels. If the company gets anything more than Rs. 2 per unit, sale is preferable.

Question : 12

Super Specialties Enterprises (SSE) has been offered a contract by Live- In Guest Houses (LIG) to build for it five special Guest Houses for use by top Management. Each Guest House will be an independent one. The contract will be for a period of one year and the offer price is Rs. One Crore. In addition, LIG will also provide 2 grounds of land free of cost for the purpose of construction. The Chief Accountant of SSE has prepared the following estimate on the basis of which he has advised that the contract should not be accepted at the price offered-

Item	Description	Rs. Lakhs
Land	3 grounds at Rs. 20 Lakhs each	60
Drawings and Designs		5
Registration		7
Materials	Cement and Sand	6
	Bricks and Tiles	4
	Steel	10
	Others (including interior decoration)	10
		30
Labour	Skilled	12
	Unskilled	8
	Supervisor's Salary	5
		25
Overhead	General	12
	Depreciation	6
		18

The Accountant also provides the following formation –

- Land:** The total requirement of land is 3 grounds costing Rs. 20 Lakhs per ground. LIG will provide 2 grounds free of cost.
- Drawing and Design:** These have already been prepared and 40% of the cost has already been incurred
- Materials:**
 - Cement and Sand are already in stock and are in regular use. If used for this contract, they have to be replaced at a cost of Rs. 8 Lakhs.
 - Bricks and Tiles represent purchases made several months before for a different contract. They could be sold readily for a net Rs. 5 Lakhs after meeting all further expenses.
 - Others: Materials worth Rs. 2 Lakhs after meeting all further expenses
- Labour:**
 - Skilled worker will be transferred to this project from another project. The project Manager claimed that if the men were returned to him, he could have earned the company an additional Rs. 2 Lakhs in terms of profits.

- The supervisor undertakes various tasks in the sites and his pay and continuity of employment will not be affected by the new contract. If the contract is taken, he will devote half of his time.

5. Overheads:

- The equipment that would be used on the contract was bought one year before for Rs. 30 Lakhs and is expected to last for five years. It can also be used on other contracts and the current replacement price will be Rs. 32 Lakhs and in a year's time it will be Rs. 25 Lakhs
- The General Overheads includes both specific and absorbed overheads. If the contract is not undertaken, Rs. 4 Lakhs of the same can be avoided.

6. SSE has also on hand another project, which would not be executed if the contract from LIG were to be accepted. The estimated profit on that project is Rs. 10 lakhs

Required:

- In the light of information given above, you are required to indicate with reasons whether the contract from LIG should be accepted or not.
- Suppose SSE offers a proposal where by LIG pays Rs. 3 Lakhs per annum towards maintenance for a four- year period. SSE will incur Rs. 1 Lakh towards operating costs for maintenance. If SSE's cost of capital is 10%, compute the total net benefit from the contract.

Answer : (in Rs. Lakhs) – Land – 20; Drawings – 3; Registration – 7; Cement – 8; Bricks – 5; Steel – 10; Interior Decoration – 1; Other – 8; Skilled – 14; Unskilled – 8; Avoidable OH – 4; Equipment – 7; Profit from another contract – 10; Total 105; Hence, contract should be rejected. (Alternative treatments for equipment exist). Also PV of future Cash Flows = 6.34; Hence if maintenance contract is also given, contract may be accepted.

Question : 13

CROP CARERS & CURERS (CCC), manufactures combination fertilizer/weed killers under the name REPELS. This is the only product CCC produces at the present time. REPELS is sold nationwide through normal marketing channels to retail nurseries and garden stores.

Raman Nursery Plans to sell a similar fertilizer/weed killer compound through its regional nursery chain under its own private label. Raman has asked CCC to submit a bid for a 25,000kg order of the private-brand compound differs from that of REPELS, the manufacturing process is very similar.

The Raman compound would be produced in 1,000 – Kg lots. Each lot would require 60 direct labour hours and the following chemicals:

Chemicals	Qty. in Kgs
MYLAM	400
DOKIC	300
WINNY	200
GIBAL	100

The first three chemicals (MYLAM, DOKIC, WINNY) are all used in the production of REPELS. GIBAL was used in a compound that CCC has discontinued. This chemical was not sold or discarded because it does not deteriorate and there have been adequate storage facilities. CCC could sell GIBAL at the prevailing market price less Re. 0.10 per Kg selling/handling expenses.

CCC also has on hand a chemical called CICEL, which was manufactured for use in another product that is no longer produced. CICEL, which cannot be used in REPELS, can be substituted for MYLAM on a one-for-one basis without affecting the quality of the Raman compound. The quality of CICEL in inventory has a salvage value of Rs. 500.

Inventory and cost data for the chemicals that can be used to produce the Raman compound are as shown below.

Raw Material	Quantity in Stock (Kgs.)	Actual price per Kg. when purchased (Rs.)	Current Market Price per Kg (Rs.)
MYLAM	22,000	0.80	0.90
DOKIC	5,000	0.55	0.60
WINNY	8,000	1.40	1.60
GIBAL	4,000	0.60	0.65
CICEL	5,500	0.75	(SALVAGE)

The current direct labour rate in Rs. 7.00 per hour, the manufacturing over head rate is established at the beginning of the year and is applied consistently throughout the year, using direct labour hours (DLH) as the base. The predetermined overhead rate for the current year, based on a two-shift capacity of 4,00,000 total DLH with no overtime, is:

Variable manufacturing Overhead	Rs. 2.25	per DLH
Fixed Manufacturing Overhead	Rs. 3.75	per DLH
Combined Rate	Rs. 6.00	per DLH

CCC's production manager reports that the present equipment and facilities are adequate to manufacture the Raman compound. However, CCC is within 800 hours of its two-shift capacity this month and for further requirements, it must schedule overtime work. If need be, the Raman compound could be produced on regular time by shifting a portion of REPELS production to overtime. CCC's rate for overtime work is 1 ½ times the regular pay rate of Rs. 10.50 per hour. There is no allowance for any overtime premium in the manufacturing overhead rate.

CCC's standard markup policy for new product is 20% of full manufacturing cost.

(a) Assume that CCC has decided to submit a bid for the order of Raman's new compound. The order must be delivered by the end of the current month. Raman has indicated that this is a one-time order that will not be repeated. Calculate the lowest price that CCC should bid for the order and not reduce its operating profit.

(b) Without prejudice to your answer to part (a), assume that Raman Nursery Plans to place regular orders for 25,000 Kg lots of the new compound during the coming year. CCC expects the demand for REPELES to remain strong again in the coming year. Therefore, the recurring orders from Raman will put CCC over its two-shift capacity. However, production can be scheduled so that 60 % of each raman order can be completed during regular hours, and REPELS production could be shifted temporarily to overtime so the raman orders could be produced on regular times. CCC's production manager has estimated that the prices of all chemicals will be stabilized at the current market rates for the coming year and that all other manufacturing costs are expected to be maintained at the same rates or amounts.

Calculate the price that CCC should quote Raman Nursery for each 25,000 Kg lot of the new compound assuming that there will be recurring orders during the coming year.

Answer : Relevant Cost = Rs. 34,750, Quotation for repetitive orders based on standard mark up of the company = 53,670.

Question : 14

Gemini Enterprises currently makes as many units of part NO. X – 248 as it needs. Sen, General Manager of Gemini Enterprises, has received a quotation from another company for making part no. X-248. Zedco will supply 1,000 units of part No. X -248 per year at Rs. 50 per unit. Zedco can begin supply on 1st July, 1998 and continue for 5 years, after which Gemini will not need the part. Zedco can accommodate any change in Gemini's demand for the part and will supply it for Rs. 50 regardless of quantity. Shah, the Controller of Gemini Enterprises, reports the following costs for manufacturing 1,000 units of part No. X-248.

Particular	Rs.
Direct material	22,000
Direct labour	11,000
Variable manufacturing overhead	7,000
Depreciation on machine	10,000
Product and process engineering	4,000
Rent	2,000
Allocation of general plant overhead costs	5,000
Total costs	61,000

The following additional information is available

- Part X – 248 is made on a machine used exclusively for its manufacture. The machine was acquired on 1st July, 1997 at a cost of Rs. 60,000. The machine has a useful life of six years and a zero terminal disposal price. Depreciation is calculated on straight line basis.
- The machine could be sold today for Rs. 15,000.
- Product and process engineering costs are incurred to ensure that the manufacturing process for part No. X-248 works smoothly. Although these costs are fixed in the short run, with respect to units of part No. X-248 they can be saved in the long run if part no. X-248 is no longer produced. If part No. X -248 is out sourced, product and process engineering costs of Rs. 4,000 will be incurred for 1997-98 but not thereafter.
- Rent costs of Rs. 2,000 are allocated to products on the basis of the floor space used for manufacturing the product. If part number X-248 is discontinued, the space currently used to manufacture it would become available. The company could the use the space for storage purposes and save Rs. 1,000 currently paid for outside storage.
- General plant overhead costs are allocated to each department on the basis of direct manufacturing labour costs. The costs will not change in total. But no general plan overhead will be allocated to part number X-248 if the part is outsourced.
- Assume that Gemini requires a 12% rate of return for this project. The following information may be useful:

Year	Present Value Factors at 12%
0	1.000
1	0.893
2	0.797
3	0.712
4	0.636
5	0.567

Required:

- Should part number X-248 be out sourced? Prepare a quantitative analysis.
- State any sensitivity analysis that seems to be advisable. Do not perform any sensitivity calculations.
- Sen is particularly concerned about his bonus for 1997-98. The bonus is based on the accounting income of Gemini Enterprises. What decision will Sen make if he wants to maximize his bonus for 1997-98?

Answer: Module's Question

Question : 15

PICK-n-CHOOSE Ltd has received an order from Sinha, to be executed for Rs. 1800 (all inclusive). The order requires the following materials, labour etc.

Material	Requirement	In stock	Book Value	Replacement Cost	Realizable value
A	100 Kg	50 Kg	Rs. 250	Rs. 7 per Kg	Rs. 3 per Kg
B	300 Kg	140 Kg	Rs. 280	Rs. 3 per Kg	Rs. 1 per Kg.

Labour: From Department I: 10 hours at Rs. 15; Department II: 8 hours at Rs. 12.

Variable Overhead: Rs. 150

Material A is one that is regularly used by the company and if used on this order, has to be replaced for use in other orders. Material B has no use and is the result of excessive purchases made for an order executed 2 year ago.

Labour in Department I is available for this order but labour in Department II is fully engaged on another order which is earning a contribution of Rs. 20 per hour. If the order from Sinha is to be executed, labour in department II has to be diverted from current operations.

State whether the order received from Sinha should be accepted. Show workings.

Answer : Total Relevant Costs for the contract = 1,726

Question : 16

“We-Change-Lives” Institute of Learning, imparts three modular courses for office assistants. It presently has two classrooms for which it pays a monthly rental of Rs. 2,000 each. These classrooms are adequate for the three courses that the Institute now offers to its students. The monthly contribution from the existing three courses are: Book-Keeping – Rs. 4,000; Typing – Rs. 3,250 and Shorthand – Rs. 2,400.

Classrooms rentals and general administration expenses have not been charged to these courses.

The proprietor is thinking of offering a course in computer programming. This could be done in the existing classroom, but only if one of the three current courses were to be discontinued. However, additional classrooms space is available in the Institute's present building, and the Proprietor is trying to decide whether to rent this space and offer the new course.

The additional space can be rented for Rs. 2,750 a month. The Proprietor expects monthly revenue of Rs. 7,850 and specific costs of Rs. 5,350 from the new programming course.

What should the institute do? Cite figures to support your calculations and conclusions.

Answer: The Institute should stop shorthand to implement new course. Otherwise status quo is preferred.

Question : 17

Nov. 1996

Amex Ltd. Produces and markets a range of consumer durable appliances. It ensures after sales service through Side-Business (SB) Ltd. The big appliances are serviced at customer's residence while small appliances are serviced at SB's workshop.

The material supplied to SB is charged at cost plus 10%. SB charges customers at 25% over the above price. For labour, the company receives 10% of the rate fixed for work done under the after sales service agreement and 15% of the rate fixed in case of jobs not covered under the agreement from SB. 60% by value of the total work undertaken by SB was for big appliances and rest accounted for small appliances during the previous year.

Amex decides to carry out all or some of the work itself and has chosen one area in the first instance. During the previous year, it earned a profit of Rs. 2,16,000 as below from SB for the area chosen:

Particular	Material	Labour
Under after-sale service agreement	Rs. 60,000	Rs. 1,00,000
For jobs not covered under the agreement	Rs. 20,000	Rs. 36,000

The Company forecasts same volume of work in that area for the ensuing period. The following three options are under consideration of the management:

- To set up a local service center to provide service for small appliances only. The existing system is to continue for big appliances.
- To set up a local service center to provide service for big appliances only. The existing system is to continue for small appliances.
- To set up a local service centre to provide service to all appliances. The existing system then stands withdrawn.

Particular	Option – I	Option – 2	Option – 3
Heat, Rent, Light etc.	125	50	150
Management Costs	108	83	150
Service Staff Costs	230	440	750
Transport Costs	25	220	230

You are required to find out the most profitable option.

Answer: Net Revenues of the three options are Rs. 2,57,600; Rs. 2,17,400; and Rs. 2,60,000 Respectively. Option 3 should be preferred.

Question -18

CA Final May-1999

Mahila Griha Udyog Industries is considering to supply its products-a special range of namkeens- to a departmental store. The contract will last for 50 weeks, and the details are given below:

	Rs.
Material:	
X (in stock- at original cost)	1,50,000
Y (on order-on contract)	1,80,000
Z (to be ordered)	3,00,000
Labour:	
Skilled	5,40,000
Non-skilled	3,00,000
Supervisory	1,00,000
General overheads	10,80,000
Total cost	26,50,000
Price offered by department store	18,00,000

Net loss

8,50,000

Should the contract be accepted if the following additional information is considered?

- (i) Material X is an obsolete material. It can only be used on another product, the material for which is available at Rs. 1,35,000 (Material X requires some adaptation to be used and costs Rs. 27,000).
- (ii) Material Y is ordered for some other product which is no longer required. It now has a residual value of Rs. 2,10,000.
- (iii) Skilled labour can work on other contracts which are presently operated by semi-skilled labour at a cost of Rs. 5,70,000.
- (iv) Non-skilled labour are specifically employed for this contract.
- (v) Supervisory staff will remain whether or not the contract is accepted. Only two of them can replace other positions where the salary is Rs. 35,000.
- (vi) Overheads are charged at 200% of skilled labour. Only Rs. 1,25,000 would be avoidable, if the contract is not accepted.

Answer: Since there is a net incremental cash inflow of Rs. 1,52,000, therefore, contract should be accepted.

Question -19

CA Final Nov.-1999

Ranka Builders has been offered a contract by Excel Ltd. to build for it five special Guest Houses for use by top management. Each Guest house be an independent one. The contract will be for period of one year and the offer price is Rs. One crore. In addition, Excel Ltd. will also provide 2 grounds of land free of cost for purpose of construction. The Chief Accountant of Ranka Builders has prepared an estimate on the basis of which he has advised that the contract should not be accepted at the price offered. His estimate was as follows:

	Rs. In Lacs
Land (3 Grounds at Rs. 20 lacs each)	60
Drawings and Design	7
Registration	10
Materials: Cement and Sand	6
Bricks and Tiles	4
Steel	10
Others (including interior decoration)	10
Labour	
- Skilled	12
- Unskilled	8
- Supervisor's Salary	5
Overheads	
General	12
Depreciation	6
Total Cost	<u>150</u>

The Accountant also provides the following information:

Land: The total requirement of land is 3 grounds costing Rs. 20 lacs per ground. Excel total requirement of land is 2 grounds free of cost.

Drawing and Design: These have already been prepared and 50% of the cost has already been incurred.

Materials:

- (i) Cement and sand are already in stock and are in regular use. If used of this contract, they have to be replaced at a cost of Rs. 8 lacs.
- (ii) Bricks and tiles represent purchases made several months before for a different contract. They could be sold readily for a net Rs. 5 lacs after meeting all further expenses.

- (iii) Others: Materials worth Rs. 2 lacs relating to interior decoration are in stock for which no alternative use is expected in the near future. However they can be sold for Rs. 1 lac.

Labour:

- (i) Skilled workers will be transferred to this project from another project. The Project Manager claimed that if the men were returned to him, he could have earned the company an additional Rs. 2 lacs in terms of profits.
- (ii) The supervisor undertakes various tasks in the sites and his pay and continuity of employment will not be affected by the new contract. If the contract is taken, he will devote half of his time.

Overheads:

- (i) The equipment that would be used on the contract was bought one year before for Rs. 30 lacs and is expected to last for five years. It can also be used on other contract and the current replacement price will be Rs. 32 lacs and in a year's time it will be Rs. 25 lacs.
- (ii) The general overheads includes both specific and absorbed overheads. If the contract is not undertaken, Rs. 4 lacs of the same can be avoided.

Ranka Builders has also on hand another project, which would not be executed if the contract from Excel Ltd. were to be accepted. The estimated profit on that project is Rs. 10 lacs.

In the light of information given above, you are required to indicate with reasons whether the contract from Excel Ltd. should be accepted or not.

Answer: Total relevant cost is Rs. 93 lacs; Contract price is Rs. 1 crore. So, the offer should be accepted.

Question -20

CA Final May-2002

A Ltd. has been offered a contract that, if accepted, would significantly increase next year's activity level. The contract requires the production of 20,000 kgs. Of product X and specifies a contract price of Rs. 1,000 per kg. the resources required in the production of each kg. of X include the following:

Resources per kg. of X

Labour:

Grade 1	2 hours
Grade 2	6 hours

Materials:

A	2 units
B	1 liter

Grade 1 labour is highly skilled and although currently under-utilized in the firm, it is A's policy to continue to pay Grade 1 labour in full. Acceptance of the contract would reduce the idle time of Grade 1 labour. Idle time payments are treated as non-production overheads.

Grade 2 is unskilled with a high turnover, and may be considered a variable cost.

The cost to A for each type of labour are:

Grade 1 Rs. 40 per hour; Grade 2 Rs. 20 per hour.

The materials required to fulfil the contract would be drawn from the materials already in stock. Material A is widely used within the firm and any usage for the contract will necessitate replacement. Material B was purchased to fulfil an expected order that was not received. If, material B is not used for the contract, it will be sold.

For accounting purposes FIFO is used. The various values and costs for A and B as follows:

	A per unit (Rs.)	B per unit (Rs.)
Book value	80	300
Replacement cost	100	320
Net realizable value	90	250

A single recovery rate for fixed factory overheads is used throughout the firm, even though some of these costs could be attributed to a particular product or department. The overheads are recovered by applying a predetermined rate per productive labour hour. Initial estimates of next year's activity, which exclude the current contract, show fixed production overhead of Rs. 60,00,000 and production labour hour of 3,00,000. Acceptance of the contract would increase fixed production overheads by Rs. 22,80,000.

Variable production overheads are accurately estimated at Rs. 30 per productive labour hour.

Acceptance of the contract would encroach on the resources used to produce and sell another product Y, which is also made by A Ltd. It is estimated that the sale of Y would then decrease by 5,000 units in the next year only. However, this reduction in sale of Y would enable attributable fixed only factory overhead of Rs. 5,80,000 to be avoided. Information on Y is as follows:

	Per unit
Selling price	Rs. 700
Labour Grade 2	4 hours
Materials relevant variable costs	Rs. 120

Required:

Advise A Ltd. on the desirability of the acceptance of the contract purely on economic considerations. Show your calculations.

Answer: Accept the contract as the pre-tax operating income is Rs. 2,00,000.

Question -21

CA Final Nov.-2000

B Ltd. is a company that has, in stock, materials of type XY that cost Rs. 75,000, but that are now obsolete and have a scrap value of only Rs. 21,000. Other than selling the material for scrap, there are only two alternative uses for them.

Alternative 1- Converting the obsolete materials into a specialized product, which would require the following additional work and materials:

Material A	600 units
Material B	1,000 units
Direct labour	
5,000 hours unskilled	
5,000 hours semi-skilled	
5,000 hours highly skilled	
Extra selling and delivery expenses	Rs. 27,000
Extra advertising	Rs. 18,000

The conversion would produce 900 units of saleable product and these could be sold for Rs. 300 per unit.

Material A is already in stock and is widely used within the firm. Although present stocks, together with orders already planned, will be sufficient to facilitate normal activity and extra material used by adopting this alternative will necessitate such materials being replaced immediately. Material B is also in stock, but it is unlikely that any additional supplies can be obtained for some considerable time, because of an industrial dispute. At the present time material

B is normally used in the production of product Z, which sells at Rs. 390 per unit and incurs total variable cost (excluding Material B) of Rs. 210 per unit. Each unit of product Z uses four units of Material B. The details of Materials A and B are as follows:

	Material A (Rs.)	Material B (Rs.)
Acquisition cost at the time of purchase	100 per unit	Rs. 10 per unit
Net realizable value	85 per unit	Rs. 18 per unit
Replacement cost	90 per unit	-

Alternative 2: Adopting the obsolete materials for use as substitute for a sub-assembly that is regularly used within the firm. Details of the extra work and materials required are as follows:

Material C 1000 units

Direct Labour:

4,000 hours unskilled
1,000 hours semi-skilled
4,000 hours highly skilled

1,200 units of the sub-assembly are regularly used per quarter at a cost of Rs. 900 per unit. The adaptation of material XY would reduce the quantity of the sub-assembly purchased from outside the firm to 900 units for the next quarter only. However, since the volume purchased would be reduced, some discount would be lost and the price of those purchased from outside would increase to Rs. 1,050 per unit for that quarter.

Material C is not available externally though 1,000 units required would be available from stocks; it would be produced as extra production. The standard cost per unit of Material C would be as follows:

	Rs.
Direct labour: 6 hours unskilled labour	18
Raw materials	13
Variable overhead; 6 hours at Re. 1	6
Fixed overhead: 6 hours at Rs. 3	<u>18</u>
	<u>55</u>

The wage rates and overhead recovery rates for B Ltd. are:

Variable overhead	Rs. 1 per direct labour hour
Fixed overhead	Rs. 3 per direct labour hour
Unskilled labour	Rs. 3 per direct labour hour
Semi-skilled labour	Rs. 4 per direct labour hour
Highly skilled labour	Rs. 5 per direct labour hour

The unskilled labour is employed on casual basis and sufficient labour can be acquired to exactly met the production requirements. Semi-skilled labour is part of the permanent labour force, but the company has temporary excess supply of this type of labour at the present time. Highly skilled labour is in short supply and cannot be increased significantly in the short-term, this labour is presently engaged in meeting the demand for product L, which requires 4 hours of highly skilled labour. The contribution from the sale of one unit of product L is Rs. 24.

Given the above information, you are required to present cost information advising whether the stocks of Material XY should be sold, converted into a specialized product (Alternative 1) or adopted for use as a substitute for a subassembly (Alternative 2).

Answer: Net relevant revenue of Alternative 1 is Rs. 20,000 and Alternative 2 is Rs. 12,000.

Question:22

Tiptop Textiles manufactures a wide range of fashion fabrics. The company is considering whether to add a further product the "Superb" to the range. A market research survey recently

undertaken at a cost of Rs. 50,000 suggests that demand for the “Superb” will last for only one year, during which 50,000 units could be sold at Rs. 18 per unit. Production and sale of “Superb” would take place evenly throughout the years. The following information is available regarding the cost of manufacturing “Superb”.

Raw Materials:

Each “Superb” would require 3 types of raw material Posh, Flash and Splash. Quantities required, current stock levels and cost of each raw material are shown below. Posh is used regularly by the company and stocks are replaced as they are used. The current stock of Flash is the result of overbuying for an earlier contract. The material is not used regularly by the Tiptop Textiles and any stock that was not used to manufacture “Superb” would be sold. The Company does not carry a stock of Splash and the units required would be specially purchased.

Raw Material	Quantity required per unit of Superb (metres)	Current stock level (metres)	Costs per metre of raw material		
			Original cost	Current replacement cost	Current resale value
Posh	1.00	1,00,000	Rs.	Rs.	Rs.
Flash	2.00	60,000	2.10	2.50	1.80
Splash	0.5	0	3.30	2.80	1.10
			-	5.50	5.00

Labour:

Production of each “Superb” would require a quarter of an hour of skilled labour and two hours of unskilled labour. Current wage rates are Rs. 3 per hour for skilled labour and Rs. 2 per hour for unskilled labour. In addition, one foreman would be required to devote all his working time for one year in supervision of the production of required to debater all his working time for one year in supervision of the production of Superb. He is currently paid an annual salary of Rs. 15,000. Tiptop Textiles is currently finding it very difficult to get skilled labour. The skilled workers needed to manufacture “Superb” would be transferred from another job on which they are earning a contribution surplus of Rs. 1.50 per labour hour, comprising sales revenue of Rs. 10.00 less skilled labour wages of Rs. 3.00 and other variable costs of Rs. 5.50. it would not be possible to employ additional skilled labour during the coming year. Because the company intends to expand in the future, it has decided not to terminate the services of any unskilled worker in the foreseeable future. The foreman is due to retire immediately on an annual pension of Rs. 6,000 payable by the company. He has been prevailed upon to stay on for a further year and to defer his pension for one year in return of his annual salary.

Machinery:

Two machines would be required to manufacture “Superb” MT 4 and MT 7. Details of each machine are as under:

		Start of the year	End of the year
		Rs.	Rs.
MT 4	Replacement cost	80,000	65,000
	Resale value	60,000	47,000
MT 7	Replacement cost	13,000	9,000
	Resale value	11,000	8,000

Straight line depreciation has been charged on each machine for each year of its life. Tiptop Textiles owns a number of MT 4 machines, which are used regularly on various products. Each MT 4 is replaced as soon as it reaches the end of its useful life. MT 7 machines are no longer used and the one which would be used for “Superb” is the only one the company now has. If it was not used to produce “Superb”, it would be sold immediately.

Overheads:

A predetermined rate of recovery for overhead is in operation and the fixed overheads are recovered fully from the regular production at Rs. 3.50 per labour hour. Variable overhead costs for “Superb” are estimated at Rs. 1.20 per unit produced.

For the decision-making, incremental costs based on relevant costs and opportunity costs are usually computed.

You are required to compute such a cost sheet for “Superb” with all details of materials labour, overhead etc., substantiating the figures with necessary explanations.

Answer: Project Rs. 3,16,250

Question : 23

X Ltd. has been approached by a customer who would like a special job to be done for him and is willing to pay Rs. 22,000 for it. The job would require the following materials:

Material	Total units required	Units already in stock	Book value of units in stock	Realisable value	Replacement cost
			Rs./unit	Rs./unit	Rs./unit
A	1,000	0	-	-	6
B	1,000	600	2	2.5	5
C	1,000	700	3	2.5	4
D	200	200	4	6	9

- Material B is used regularly by X Ltd. and if stocks are required for this job, they would need to be replaced to meet other production demand.
- Materials C and D are in stocks as a result of previous excess purchase and they have restricted use. No other use could be found for material C but material D could be used in another job as substitute for 300 units of material E which currently costs Rs. 5 per unit (of which the company has no units in stock at the moment).

What are the relevant costs of material, in deciding whether or not to accept the contract? Assume all other expenses on this contract to be specially incurred besides the relevant cost of material is Rs. 550.

Answer: T. Relevant cost Rs. 16,000.

Question : 24

The Aylett and Co., Ltd has been offered a contract, if accepted would significantly increase next year's activity levels. The contract requires the production of 20,000 kg. of product X and specifies a contract price of Rs. 100 per kg. The resources used in the production of each kg. of X include the following:

Resources per kg. of Product X

Labour Grade	1	2 hours
Grade	2	6 hours
Materials	A	2 units
	B	1 litre

Grade 1 labour is highly skilled and although it is currently under utilized in the firm it is Aylett's policy to continue to pay grade 1 labour in full. Acceptance of the contract would reduce the idletime of grade 1 labour. Idle time payments are treated as non-production overheads.

Grade 2 is unskilled labour with a high turnover and may be considered a variable cost.

The costs to Aylett of each type of labour are:

Grade 1	Rs. 4 per hour
Grade 2	Rs. 2 per hour

The materials required to fulfill the contract would be drawn from those materials already in stock. Materials A is widely used within the firm and any usage for this contract will necessitate replacement. Materials B was purchased to fulfil an expected order that was not received, if material B is not used for the contract, it will be sold. For accounting purposes FIFO is used. The various values and costs for A and B are:

	A Per Unit Rs.	B Per Litre Rs.
Book value	8	30
Replacement cost	10	32
Net realizable value	9	25

A single recovery rate for fixed factory overheads is used throughout the firm even though some fixed production overheads could be attributed to single products or Departments. The overhead is recovered per productive labour hour and initial estimates of next year's activity, which excludes the current contract, show fixed production overheads of Rs. 6,00,000 and productive labour hours of 3,00,000. Acceptance of the contract would increase fixed production overheads by Rs. 2,28,000. Variable production overheads are accurately estimated at Rs. 3/- per productive hour.

Acceptance of contract would be expected to encroach on the sale and production of another product, Y which is also made by Aylett Ltd..It is estimated that sales of Y, would then decreases by 5,000 units in the next year only. However this forecast reduction in sales of Y would enable attributable fixed factory overheads of Rs.58,000 to be avoided. Information on Y is as follows:

	Per Unit
Sales Price	Rs.70
Labour-Grade2	4Hours
Material-relevant variable costs	Rs.12

All activity undertaken by Aylett is job costed using full, absorption costing in order to derive a profit figure for each contract if the contract for X is accepted it will be treated as a separate job for routine costing purpose. The decision to accept or reject the contract will be taken in the sufficient time to enable its estimated, effects to be incorporated in the next year's budgets in the calculations carried out to derive the overhead recovery rate to be used in the forthcoming year.

Required:

- Advise Aylett on the desirability of the contract.
- Show how the contract, if accepted, will be reported on by the routine job costing system used by Aylett.
- Briefly explain the reasons for any differences between the figure used in (a)and (b) above.

Answer: (i) Relevant Profit: Rs. 20,000

(ii) Profit on Historical Costing System Rs. (80,000)

Question : 25

Intervero Ltd., a small engineering company, operates a job order costing system. It has been invited to tender for a comparatively large job which is outside the range of its normal activities and, since there is surplus capacity, the management are keen to quote as low a price as possible. It is decided that the opportunity should be treated in isolation without any regard to the possibility of its leading to further work of a similar nature (although such a possibility does exist). A low price will not have repercussions on Intervero's regular work.

The estimating department has spent 1000 hours on work in connection with the quotation and they have incurred travelling expenses of Rs. 550 in connection with a visit to the prospective customer's factory. The following cost estimates has been prepared on the basis of their study.

Inquiry 205 H81		
Cost Estimate		
	(Rs.)	(Rs.)
Direct material and components:		
2,000 units of A at Rs. 25 per unit	50,000	
200 units of B at Rs. 10 per unit	2,000	
Other material and components to be bought is (specified)	<u>12,500</u>	
		64,500
Direct Labour:		
700 hrs. of skilled labour at Rs. 3.50 per hour		2,450
1,500 hrs. of unskilled labour at Rs. 2 per hour		3,000
Overhead:		
Department P-200 hrs. at Rs. 25 per hour		5,000
Department Q-400 hrs. at Rs. 20 per hour		8,000
Estimating Department:		
100 hours at Rs. 5 per hour		500
Travelling expenses		550
Planning Department:		
300 hours at Rs.5 per hour		1,500
		85,500

The following information has been brought together:

Material A: This is a regular stock item. The stock holding is more than sufficient for this job. The material currently held has an average cost of Rs. 25 per unit but the current replacement cost is Rs. 20 per unit.

Material B: A stock of 4,000 units of B is currently held in the stores. This material is slow moving and the stock is the residue of a batch bought seven years ago at a cost of Rs. 10 per unit. B currently costs Rs. 24 per unit but the resale value is only Rs. 18 per unit. A foreman has pointed out that B could be used as substitute for another type of regularly used raw material which costs Rs. 20 per unit.

Direct Labour: The work force is paid on a time basis. The company has adopted no redundancy policies which mean that skilled workers are frequently moved to jobs which do not make proper use of their skills. The wages included in the cost estimate are for most of the mix of labour which the job ideally requires. It seems likely, if the job is obtained, that most of the 2,200 hours of direct labour will be performed by skilled staff receiving Rs. 3.50 per hour.

Overhead: Department P : It is a department of Intervero Ltd., that is working at full capacity. The department is treated as a profit centre and it uses a transfer price of Rs. 25 per hour for charging out its processing time to other departments. This charge is calculated as follows:

	Rs.
Estimated variable cost per machine hour	10
Fixed departmental overhead	8
Departmental profit	7
	<u>25</u>

Department P's facilities are frequently hired out to other firms and a charge of Rs. 30 per hour is made. There is a steady demand from outside customers for the use of these facilities.

Overhead: Department Q : Department Q uses a transfer price of Rs. 20 for charging out machine processing time to other Departments. This charge is calculated as follows:

	Rs.
Estimated variable cost per machine hour	8
Fixed departmental overhead	9
Departmental profit	3
	<u>20</u>

Estimating department: This department charges out its time to specific jobs using a rate of Rs.5/- per hour. The average wage rate within the department is Rs.2.50 per hour but the higher rate is justified as being necessary to cover departmental overheads and the work done on unsuccessful quotations.

Planning department: This department also uses a charging out rate which is intended to cover all departmental costs.

The offer received for the above contract is Rs. 70,000.

You are required to restate the cost estimate by using an opportunity cost approach. Make any assumptions that you deem to be necessary and briefly justify each of the figures that you give.

Answer: Relevant Total Cost Rs. 65,700.

Question: 26

Engineers Ltd is just ready to deliver a machine specially designed for Durables & Co. When it is learnt that the latter has gone bankrupt.

An enquiry comes from another firm, Steady Enterprises, which can accepted the machine meant for Durables & Co. If certain alternations are done to suit. Steady Enterprises' needs and the price is attractive.

The following factors prevail:

Costs incurred on the machine for Durables & Co.

	Rs.
(a) Direct materials	5,60,000
(b) Direct labour	4,00,000
(c) Variable overhead	1,40,000
(d) Fixed overhead	3,00,000
(e) Fixed selling and distribution overhead	1,00,000
Total	<u>15,00,000</u>

Notes: If the negotiation with Steady Enterprises Fails, part of the material used may be dealt with as under:

- (a-i) Brass materials- could be sold as scrap for Rs. 1,00,000
- (a-ii) Steel material- could be sold as scrap for Rs. 26,000, but to sell it as scrap some 100 hours labour will be hired at Rs. 10 per hour to bring it to bring it to saleable condition.
- (a-iii) Balance materials will have to be removed at a cost of Rs. 5,000, but will have a "nil" sale value.

Price Quoted to Durables & Co. was Rs. 18,00,000.

To cater to Steady Enterprises needs, the alteration cost will be:

Department M	Department A
--------------	--------------

Direct material	Rs. 10,000	Rs. 5,000
Direct labour	10 men for 2 months@ Rs.3000 per man-per month	6 women for 2 months 2000 per women per month
Variable overhead	20% of direct labour cost	25% of direct labour cost
Fixed overhead	60% of direct labour cost	50% of direct labour cost

Notes:

1. Material required are already in stock and valued at cost. If the work for Steady Enterprises is not undertaken, the company has the following choice.
 - (a) Material for Department M will be used for another job.
 - (b) Material for department A Lying as it is for some years, will remain put on quick sale for Rs. 3,000.

The present market prices for the materials for M and A are Rs. 12,000 and Rs. 6,000 respectively.

2. Department M is currently working at full capacity earning a contribution of Rs.3 towards fixed overhead and profit per Rs. 1 of labour.
3. Department A is presently working at 40% of its capacity, but as per agreement with the Union Its present work force of 24 women cannot to reduced. A worker in this department gets Rs. 2,000 a month as wages. In order to utilize its labour, Department A undertakes some off-loading work for Rs. 32,500 per month from a sister concern when the workload in Department A falls below 50% capacity. Variable cost associated with the off-loading work is Rs. 4,000 per month. The conversion work for Steady Enterprises will mean 25% additional workload for Department A for Two months.

The pattern and specification of the original machine could be sold to a customer for Rs. 60,000. For supervision of the job for Steady Enterprises, a temporary Supervisor would be needed for 2 months at an agreed salary of Rs. 10,000. He will be a person deputed by Steady Enterprises. The company charges all indirect and supervisory salaries to fixed overhead.

Durables & Co. has already made an earnest money deposit of Rs. 1,80,000 for the machine. As per terms of the contract this deposit stands forfeited and Engineers Ltd. is now free to treat the sum as miscellaneous income. Taxation may be ignored.

Required: Engineers Ltd. seeks your advice for the minimum price, based on relevant costs only, for the quotation it will make to Steady Enterprises.

Answer: Minimum price : Rs. 5,20,000.

Question: 27

A company had nearly completed a job relation to construction of a specialized equipment, when it discovered that the customer had gone out of business. At this stage the position of the job was as under:

	Rs.
Original cost estimate	1,75,200
Costs incurred so far	1,48,500
Cost to be incurred	29,700
Progress payments received from original customer	1,00,000

After searches a new customer for the equipment has been found. He is interested to take the equipment, If certain modification are carried out. The new customer wanted the equipment in its original condition, But without its control device and with certain other modifications. The costs of the additions and modifications are estimated as under:

Direct Materials (at cost)	Rs. 1,050
Direct Wages	
Dept.	A 15 man days
Dept.	B 25 man days
Variable overheads 25% of direct wages in each Department.	
Delivery costs	Rs. 1,350
Fixed overheads will be absorbed at 50% of direct wages in each department.	

The following additional information is available:

1. The direct material required for the modification are in stock and if not used for modification of this order, they will be used in another job in place of materials that will now cost Rs. 2,250.
2. Department A is working normally and hence any engagement of labour will have to be paid at direct wage rate of Rs. 120 per man day.
3. Department B is extremely busy Its direct wages rate is Rs. 100 per man day and it is currently yielding a contribution of Rs. 3.20 per rupee of direct wages.
4. Supervisory overtime payable for the modification is Rs. 1,050.
5. The cost of the control device that the new customer does not require is Rs. 13,500. If it is taken out, It can be used in another job in place of a different mechanism. The latter mechanism has otherwise to be bought for Rs. 10,500. The dismantling and removal of the control mechanism will take one man day in department A.
6. If the convention is not carried out, some of the materials in the original equipment can be used in another contract in place of material that would have cost Rs. 12,000. It would have taken 2 man days of work in department A to make them suitable for this purpose. The remaining materials will realize Rs. 11,400 scrap. The drawings which are included as part of the job can be sold for Rs. 1,500.

You are required to calculate the minimum price, which the company can afford to quote for the new customer as stated above.

Answer:	Rs.
Total minimum price which may be quoted:	61,975
Balance cost of control device:	10,350
Net loss on material cost saving of equipment:	11,700

Question: 28

Noval Accessories have been manufacturing a joy figurate to be fitted on car bonnets. One of the figurate resembles a tiny model of Ashokan pillar with the Lion Capital. As the care fitted with these have been mistaken by the public as belonging to Government dignitaries, on a complaint, the police authorities have banned the use of this on car bonnets. The company is now left with an inventory of 8,000 units of this figurate and manufacturing costs per unit were as follows:

Material	1.20
Labour	0.80
Fixed overheads	0.50
Total	2.50

Prior to being banned the selling price was Rs. 3 per unit. The alternative courses of action:

1. Sell the units as scrap metal for Rs. 6,500.
2. Rework them by putting a base on them which would allow them to be sold as Drawing Room curious at a price of Rs. 3.20 each. Such work would require Rs. 2 per unit of additional labour and a fixed overhead charge of Rs. 1 each would be entailed in terms of the company's absorption costing system. No further materials would be required.
3. Melt them down and use the metal as a substitute in a strong selling line where the metal currently used costs 50 per cent more than the material used in the figurate. This process would incur a materials loss of three eights of the original metal.

You are required to examine each of these alternatives and arrive at the decisions, which would result in the greatest benefit to the company.

Answer: Rs. 6500; 9600; 9000

Question: 29

XYZ Ltd. has to date spent Rs. 75,000 on a research project and it expects that when completed in a further year the results of that research can be sold for Rs. 1,00,000. In trying to decide whether to proceed the business identifies the additional expenses necessary to complete the research:

Materials: Rs. 30,000. This materials (already in store and paid for is very toxic and will have to disposed of in sealed containers at a cost of Rs. 2,500.

Labour: Rs. 20,000. The research project uses highly skilled labour taken from the production department of the company. If they were working on normal production, the company could earn Rs. 25,000 additional contribution to profit in the next year after paying the skilled labour.

Research Staff: Rs. 30,000. The research unit will close down after the project has been completed and consolidated retirement pay has already been agreed at Rs. 12,500 General Overheads. Rs. 20,000. The research unit is apportioned a share of the fixed costs of business.

The management Accountant of the company has presented the following analysis and recommended against continuation, since the analysis that the company would lose Rs. 25,000 more by continuing the project than by abandoning now.

The Managing Director seeks your opinion as the group Management accountant about the analysis presented by the Management Accountant

	Abandon now Rs.	complete the Project Rs.
Sales	-	1,00,000
Costs to date	75,000	75,000
Additional Costs:		
Material	30,000	
Labour	20,000	
Research staff	30,000	
Overheads	20,000	
Loss in contribution	25,000	2,00,000
Net loss	75,000	1,00,000

Answer : Profit/(Loss) = Rs. 27,500

Question: 30

W Ltd. is to produce a new product in a short-term venture which will utilize some obsolete materials and expected spare capacity. The new product will be advertised in quarter I with production and sales taking place in Quarter II. No. further production or sales are anticipated.

Sales volumes are uncertain but will to some extent be a function of sales price. The possible sales volume and the advert. Costs associated with each potential S.P. are as follows

Sales Price Rs. 20 per units		Sales Price Rs. 25 per unit		Sales Price Rs. 40 per unit	
Sales volume (units 000's)	Prob.	Sales volume (units 000's)	Prob.	Sales volume (units 000's)	Prob.
4	0.1	2	0.1		
6	0.4	5	0.2	3	0.5
8	0.5	6	0.2	10	0.2
---	---	8	0.5	15	0.3
Adv. Cost	Rs. 20,000		Rs. 50,000		Rs. 1,00,000

The resources used in the production of each unit of the product are:

Production labour:

Grade-I	2 hours
Grade-II	1 hours

Materials:

X	1 unit
Y	2 unit

The normal cost per hours of labour is

Grade – I	Rs. 2
Grade – II	Rs. 3

However, before considering the effects of the current venture there is expected to be 4,000 hours of idle time for each grade of labour in Quarter II. Idle time is paid at the normal rates.

Material X is in stock at a book value of Rs. 8 per unit but widely used within the firm and any usage for the purpose of this venture will require replacing. Replacement cost Rs. 9 per unit.

Material Y is obsolete stock. There are 16,000 units in stock.

At a book value of Rs. 3.50 per unit and any stock not used will have to be disposed of at a cost to W, Ltd. of Rs. 3 per unit. Further quantities of Y can be purchased for Rs. 4 per unit:

Overhead recovery rates are :

Variable Overhead Rs. 2 per direct labour hour worked. Fixed overhead Rs. 3 per direct labour hour worked. Total fixed overheads will not alter as a result of the current venture.

Feedback from advertising will enable the exact demand to be determined at the end of Quarter I and Production in Quarter II will be set to equal that demand. However it is necessary to decide now on the sales price in order that it can be incorporated into the advertising campaign.

Required:

Calculate the expected money value of the venture at each sales price and on the basis of this, advise W Ltd. of its best course of action.

Question: 31

AB Limited has just completed production of an item of special equipment for a customer: ST Limited only to be notified that the customer has gone into liquidation.

After much effort the sales manager has managed to locate one potential buyer VW Limited that has indicated that it might be prepared to buy machine if certain conversion work could be carried out.

The selling price of the machine to the original buyer has fixed at Rs. 25,300 and had included as estimated normal profit markup of 10 per cent on total costs. The costs incurred in the manufacture of the machine were:

	Rs.
Direct material	9,500
Direct wages	6,000
Overheads : Variable	1,500
Fixed production	5,000
Fixed selling & administration	1,000
Total	23,000

If the machine is converted production management estimates that the following extra work would be needed.

Direct Material at cost Rs. 1,600

Direct wages :

Department L : 3 men for 4 weeks at Rs. 75 per man/week
 Department M : 1 men for 4 week at Rs. 60 per man/week

Variable Overhead :

20 per cent of direct wages

Fixed production overhead :

Department L : 83-1/3 per cent of direct wages
 Department M : 25 per cent of direct wages.

The following additional information is available :

- In the original machine there are three types of basic material:
 - Type p would be sold to a scrap merchant for Rs. 1,500
 - Type Q would be sold to the scrap merchant for Rs. 1,000 but it would cost Rs. 90 to put it into a suitable condition for sale.
 - Type R would need to be scrapped at a cost to AB limited of Rs. 300
- The materials for the conversion are at stock. If not needed for the conversion. They could be used in the production of another machine in place of materials that would currently cost Rs. 1900.
- The conversion would be carried out in two departments. Department 1 is currently extremely busy and it is estimated that its contribution to overhead and profit is Rs. 2.50 per Re. 1 of labour

Department M is very short of work. For organizational reason its labour force cannot be reduced below its present level of four employees. All of whom are paid at the standard wage of Rs. 60 per week. The load of work on these employee is however only 40 per cent of their standard capacity.

4. The design and specification of the original machine could be sold overseas for a sum of Rs. 750 if the machine is scrapped
5. An additional temporary supervisor would have to be engaged for the conversion work at a cost of Rs. 450. It is the company's normal practice to charge supervision to fixed overhead.
6. Customer ST Limited paid a non-returnable deposit to the company of 12 per cent of the selling price.

You are required to calculate the minimum price the AB Limited should accept from VW Limited for the converted machine.

Answer : 8588.

CHAPTER-2

DIFFERENTIAL COSTING

Question: 1

The Z company owns and operated a chain of 25 stores.

Budgeted data for the Garden Stored are as follows:

	Rs.
Annual sales	4,25,000
Annual cost of goods sold and other	3,82,000
Annual building ownership costs (not included above)	20,000

The company can lease the building to a large flower ship for Rs. 4,000 per month.

Decided whether to continue operations of this store or to leas using.

1. The total project (or comparative statement approach);
2. The incremental (or relevant cost) approach;

3. The opportunity cost approach.

Answer: The Company should lease out the building (5,000) (i) 23,000 & 28,000 (ii) 5,000, (iii) 5,000. Incremental loss form continuing the operation: 5,000.

Question: 2

Mr. A has taken a shop on lease by making a down payment of Rs. 12,500 besides, he has to pay a rent Rs. 12,500 will be forfeited.

He plans to use the shop for sale of ready-make garments and has estimated the income and expenditure of the shop as under for the next year:

	Rs.
Net sales	2,50,000
Cost of goods sold	1,25,000
Wages	30,000
Rent including down payment	25,000
General expenses	37,500
Total A	2,17,500
Profit	32,500

In the event of his not willing to devote his time to this business, he can sublet the shop for Rs. 1,375 per month. You are required to recalculate the profit, which A will earn from running the ready-made garments shop by clearly identifying the sunk and opportunity costs.

Answer: Net income= Rs. 41,000 Opp. Cost Rs. 40100/16,500, Sunk Cost Rs. = 12,500

Question: 3

ZED Ltd. operates two shops. Product A is manufactured in Shop-1 and customers' jobs against specific orders are being carried out in Shop-2 Its annual statements of income is:

	Shop-1 (Product A) Rs.	Shop-2 (Job works Rs.)	Total Rs.
Sales/Income	1,25,000	2,50,000	3,75,000
Material	40,000	50,000	90,000
Wages	45,000	1,00,000	1,45,000
Depreciation	18,000	31,500	49,500
Power	2,000	3,500	5,500
Rent	5,000	30,000	35,000
Heat and light	500	3,000	3,500
Other expenses	4,500	2,000	6,500
Total Costs	1,15,000	2,20,000	3,35,000
Net income	10,000	30,000	40,000

The depreciation charges are for machine used in the shops. The rent and heat and light are apportioned between the shops on the basis of floor area occupied. All other costs are current expenses identified with the out-put in particular shop.

A valued customer has given a job to manufacture 5,000 units of X for shop-2. As the company is already working at its full capacity, it will have to reduce the output of product-A by 50% to accept the said job. The customer is willing to pay Rs. 25 per unit of X. The material and labour will cost Rs. 10 and Rs. 18 respectively per unit. Power will be consumed on the job just equal to the power saved on account of reduction of output of A. In addition, the company will have to incur additional overheads of Rs. 10,000.

You are required to compute the following in respect of this job:

- (a) Differential cost;
- (b) Full cost
- (c) Opportunity cost; and
- (d) Sunk cost

Advice whether the company should accepted the job using

- (a) Comparative approach (full cost approach)
- (b) Differential approach
- (c) Opportunity approach

Question: 4

(Quoting for an order – Desired minimum price. A small – scale manufacture produces an article at the operated capacity of 10,000 units while the normal capacity of his plant is 14,000 units. Working at a profit margin of 20% on sales realization he has formulated his budget as under.

	Rs.	Rs.
	10,000	14,000
Sales realization	2,00,000	2,80,000
Variable overheads	50,000	70,000
Semi-variable overheads	20,000	22,000
Fixed overheads	40,000	40,000

He gets an order for a quantity equivalent to 20% of the operated capacity and even on this additional production, profit margin is desired at the same percentage on sales realization as for production to operated capacity.

Assuming prime cost is constant per unit of production what should be the minimum price to realize this objective?

Answer: S.P. = Rs. 13.125

Question: 5

Quoting for a export order. Somesh of Agra presently operates its plant at 80% of the normal capacity to manufacture a product only to meet the demand of Government of Tamil Nadu under a rate contract.

He supplies the product for Rs. 4,00,000 and earns a profit margin of 20% on sales realizations. Direct cost per unit is constant. The indirect costs as per his budget projections are:

Indirect costs	20,000 units (80% capacity) Rs.	22,500 units (90% capacity) Rs.	25,000 units (100% capacity) Rs.
Variable	80,000	90,000	1,00,000
Semi variable	40,000	42,500	45,000
Fixed	80,000	80,000	80,000

He has received an export order for the product equal to 20% of its present operations. Additional packing charges on this order will be Rs. 1,000.

Arrive at the price to be quoted for the export order to give him a profit margin of 10% on the export price.

Answer: S.P. = Rs. 12.50

Question: 6

X Ltd. having an installed capacity of 1,00,000 units of a product is currently operating at 70% utilization. At current levels of input prices, the FOB unit costs (after taking credit for applicable export incentives) work out as follows:

Capacity Utilization Per cent	FOB unit Costs Rs.
70	97
80	92
90	87
100	82

The company has received three foreign offers from different sources as under:

Source A	5,000 units at Rs. 55 per unit FOB
Source B	10,000 units at Rs. 52 per unit FOB
Source C	10,000 units at Rs. 51 per unit FOB

Advise the company as to whether any or all export orders should be accepted or not.

Answer: All are accepted.

Question: 7

S.V. Ltd. budgets to make 1,00,000 units of a product. VC per unit Rs. 10 F.C. Rs. 6,00,000. The FINANCE DIRECTOR suggested that cost plus approach should be used with a profit mark up of 25 per cent of cost. However the MARKETING DIRECTOR supplied the following information's:

Price per unit Rs.	Demand (Units)
18	84,000
20	76,000
22	70,000
24	64,000
26	54,000

What are your comments as Management Accountant ?

Answer: Profit as per financial Manager : $76,000 \times (20-10) - 6,00,000 = 1,60,000$

Question: 8

A company manufactures two products AB and CD by utilizing 25% and 40% of its total capacity respectively. The cost data per unit for 1994-95 are as under:

	AB	CD
Production and Sales (Units)	5,000	10,000
Selling Price (Rs.)	80	100
Direct material	10	30
Direct labour (Rs. 5 per hour)	25	20

Variable overheads are 100% on wages. Fixed overheads for 1994-95 amounted to Rs. 2,25,000.

During 1995-96, the company expected that the direct material costs will rise by 5%, the labour hourly rate will rise by 25 paise and variable overheads will continue to maintain same relationship with wages as was in 1994-95.

For the same volume of output as was in 1994-95, the selling price is to be enhanced by 5% in case of AB of 4% in case of CD.

The company has the following proposals for consideration of the management for 1995-96 to improve profitability:

- Utilize the balance capacity to produce AB and to sell this increased production at the existing selling price of Rs. 80.
- Utilize the balance capacity to produce CD. While doing so the efficiency will however go down by 16% on account of newly recruited labour in respect on this increased production. Fixed selling and distribution expenses of Rs. 50,000 will have to be spent to sell this additional output.
- Introduce new product EF to utilize the balance capacity. One unit of EF can be manufactured in 7 labour hours. Direct Material will cost Rs. 40 per unit. Its selling price per unit will be Rs. 145. Variable overheads will maintain same ratio to wages as for other two products. To boost the sales of EF special advertising expenses of Rs. 30,000 will be spent.

The present allocation of 25% and 40% capacities for AB and CD cannot be changed and only the spare capacity is required to be used for production under the aforesaid proposals.

Required:

- Present a statement of profit for 1994-95.
- Using incremental revenue and differential cost approach. Find out which proposal is more profitable for 1995-96.
- Present a statement of profit for 1995-96 based on above recommendation.

Answer: Profit = 1,75,000; Balance capacity = 35% or 35,000 hours.

Differential Cost per unit : Rs. 3.00, 63.00, 3.50

Difference Rs. 5,000, 1,19,000, 5,000 = 1,29,000

Rs. 5,000, 5,000, 1,15,375 = 1,25,375

Rs. 5,000, 5,000, 1,27,500 = 1,37,500

Total Profit = 3,12,500.

Question: 9

Mr. Philips owns a gift shop, a restaurant and lodge in Shimla. Typically he operates these only during the season period of four months in a year. For the past season the occupancy rate in the lodge was 90% and level of activity in case of gift shop and restaurant at 80%. The relevant data for the past season were as under:

	Gift Shop		Restaurant		Lodge	
	Amount	%	Amount	%	Amount	%
Receipt/Sales	48,000	100	64,000	100	1,80,000	100
Expenditure						
Cost of sales	26,400	55	35,200	55	-	-
Supplies	2,400	5	6,400	10	14,400	8
Insur. and tax	1,920	4	6,400	10	36,000	20
Depreciation	2,800	6	8,000	12.5	39,600	22
Salaries	4,800	10	4,800	7.5	25,200	14
Elec. Charges	960	2	3,200	5	13,500	7.5
Total	39,369	82	64,000	100	1,28,700	71.5
Profit	8,640	18	-	-	51,300	28.5

Additional information:

1. Cost of sales and supplies vary directly with the occupancy rate in case of lodge and level of activity in case of gift shop and restaurant.
2. Insurance, taxes and depreciation are for the entire period of twelve months.
3. Salaries paid are for the season period except a chowkidar for the lodge that is paid for the full year at Rs/ 400 per month.
4. Electricity charges include fixed charges of Rs. 640 Rs. 1,920 and Rs. 9,900 for gift shop restaurant and lodge respectively. The balance amount varies directly with occupancy rate in case of lodge and level of activity in case of gift-shop and restaurant. Fixed electricity charges are for the season except in case for lodge where Rs. 6,900 is for the season and Rs. 3,000 for the entire period for twelve months.

Mr. Philips is interested in increasing his net income, the following tow options are under his consideration.

1. To continue the operation during the season period only by inserting advertisement in newspapers hereby occupancy rate to each 100% in case of lodge and 90% level of activity in respect of gift shop and restaurant. The cost of advertisement are estimated at Rs. 12,000.
2. To continue operations throughout the entire period of twelve months compressing season period of four months and off-season period of eight months, the occupancy rate is expected at 90% and 40% during reason period and off season period respectively in case of the lodged. The room rents are bound to be reduced to 50% of the original rates during off-season period. The level of activity of gift shop and restaurant is expected at 80% and 30% during season and off-season period respectively but 5% discount on the original rates will have to be offered during off-season period.

Which option is profitable, As a cost Accountant would you like to suggest him any other alternative based upon the above figure which can be adopted to earn more net profit. (use incremental revenue and differential cost approach.)

Answer: Rs. 11,000, RS. 10,880

Question-10

The following data is extracted from the budget document of Rao Ltd. which pertains to the calendar year 1984

Capacity	60%	70%	80%	90%	100%	101-120%
Factory exp.	45,000	45,000	50,000	50,000	60,000	70,000
Fixed fact. Costs	60,000	60,000	60,000	60,000	60,000	65,000
Office overhead	40,000	40,000	40,000	40,000	40,000	40,000
Total	1,45,000	1,45,000	1,50,000	1,50,000	1,65,000	1,75,000

Installed capacity of the plant: 10,000 tonnes per annum which could be expended up to a margin of 20% by incurring additional expenses of Rs. 10,000.

Selling and distribution costs including commission to distributors account for 10 per cent of the sales value.

Up to April 1984, the company has been able to market completely its production fully locally at a unit realization value of Rs. 80 per tonne. Production fully locally at a unit realization value of RS. 80 per tonne, Monthly production of 750 tonnes is expected to be maintained throughout the year, which will satisfy the local market. The company will be able to maintain its sale price locally.

Direct labour, direct material and direct expenses account for 60 per cent of the price of the product.

The company has received an enquiry from abroad for manufactures and supply of 3,000 tonnes at US\$ 6 per tonne c.i.f. commission payable to a foreign agent will be 50 cent per tonne and insurance and freight charges are estimated at 50 cent per tonne., the export order will fetch the company an export incentive licenses for 20 per cent of the quantum of exports, the current market value of the license, which can be transferred freely, is Rs. 60 per tonne.

Kindly indicate whether the export order can be accepted by the company.

Working should form part of your answer.

Answer: 7,000 Export order benefits. Total Profit : 66,000+7,000

Question 11

A company can produce and sell at its maximum capacity 20,000 units of a product. The sale price is Rs. 100. The present sales is 15,000 units. To produce over 20,000 units and up to another 10,000 units some balancing equipments are to be installed at a cost of Rs. 10 lakhs and the same will have a life span of 10 years.

The current cost structure is as under:

Direct material	30% of sale value
Direct labour	20% of sale value
Variable overheads	Rs. 20 per unit
Profit	Rs. 15 per unit.

The present cost is estimated to go up due to price escalation as under:

10% in Direct Material from present level of 30%

25% in Direct Labour from present level of 20%

Rs. 50,000 in fixed overheads per year.

There is a concrete proposal from a party to take 10,000 units additionally over the present level of output on a long-term basis at a unit price of Rs. 90. A part from the investment of Rs. 10 lakhs as shown above, the fixed overheads will increase by Rs. 50,000 due to additional administrative expenses.

The company is in a dilemma as to whether to accept the order for 10,000 units or to use the present unused capacity of 5,000 units from which there will be additional selling expenditure of Rs. 50,000.

Ignore financing charge and give your recommendation.

Answer: fixed overheads, it is noted from the given cost structure that all elements of cost (Except fixed overheads) are given. Therefore fixed overheads are found out as under.

Question 12

Estimated direct material requirement of a business concern viz., ABC Ltd., for the year 1998-99 are 1,20,000 units. Unit cost for orders below 1,20,000 units is Rs. 10. When size of order equals 1,20,000 units or more the concern received a discount of 2% on the above quoted per unit price. Keeping in view the following two alternatives:

1. Buy 1,20,000 units at the start of the year.
2. Buy 10,000 units per month

Calculate the opportunity cost, if the concern has the facility of investing surplus funds in government bonds at the rate of 10% interest.

Answer: 26,000. 55,000

Question : 13

A machine manufactures 10,000 units of a part at a total cost of Rs. 21 of which Rs. 18 is variable. This part is readily available in the market at Rs. 19 per unit.

If the part is purchased from the market then the machine can either be utilized to manufacture a component in same quantity contributing Rs. 2 per component or it can be hired out at Rs. 21,000. Recommend which of the alternative is profitable?

Solution:

Ist Alternative:

10,000 units of the part are manufactured internally variable cost of 10,000 units @ Rs. 18 per unit (Rs.) 1,80,000

IInd Alternative:

10,000 units of the part are purchased from the market and the machine is utilized to manufacture 10,000 unit of a component contributing Rs. 2 per unit.

Purchase cost of 10,000 units @ Rs. 19 per unit (Rs.)	1,90,000
Less : cont. received on the utilization of machine time {10,000 units x Rs. 2}	20,000
	1,70,000

IIIrd Alternative:

10,000 units of the part are purchased from outside and the machine time is hired out at (Rs. 21,000)

Purchase cost of 10,000 units @ Rs. 19 per unit (Rs.)	1,90,000
Less: Rent received on hiring out the machine	21,000
	1,69,000

Please note that in the problem fixed cost is not relevant for decision making, hence has been ignored.

Recommendation : the above analysis shows that the cost of 10,000 units is lowest under Alternative III. Hence it is the best and should be adopted.

Question : 14

The budget estimate of a company using sophisticated high speed machines based on a normal working of 50,000 machine hours during 1986 are as under:

	Rs. Lacs
Sales (1,00,000 units)	100
Raw materials	20
Direct wages	20
Factory overheads:	
Variable	10
Fixed	10
Selling and distribution overheads:	
Variable	5
Fixed	5
Administration overheads:	
Fixed	10
Total cost	80
Profit	20

Since the demand for the company's product is high, the possibilities of increasing the production are explored by the budget committee. The technical Director's stated that maintenance has not been given due importance in the budget and that if preventive maintenance is introduced, the breakdown repair costs are the hours lost due to breakdown can be reduced and consequently production can be increased.

In support of this, he presented the following data, showing how injection of more and more funds on preventive maintenance will bring down the break down repair costs and reduce or eliminate the machine stoppages due to breakdown.

Proposed exp. On preventive Maintenance Rs.	Exp. Estimated to be incurred on Breakdown Repairs Rs.	Machine hours saved.
19,200	1,92,000	Nil
38,400	1,53,600	800
76,800	1,15,200	1,600
1,53,600	76,900	2,400
3,07,200	57,600	3,200
6,14,400	-	4,000

Using differential and contribution concept, advice the management upto what level breakdown hours can be reduced to increase production and maximize profits of the company consistent with minimum costs.

Answer: 1 Contribution per unit: Rs. 45, Contribution per machine hour : Rs. 90 up to iv level it is justify to spend P.M. 1,53,600

Question: 15

The management accountant of X Ltd. Has prepared following estimates of working results for the year ending 31st December, 1986 for the purpose of preparing the budget for the year ending 31st December.

	Rs./unit	Year ending 31.12.1986
Direct Material	16	
Direct wages	40	
Variable overheads	12	
Selling price	Rs. 125	
Fixed expenses	Rs. 6,75,000 P.A.	
Sales	Rs. 25,00,000 P.A.	

During the year 1987 it is expected that eh material prices and variable overhead will go up by 10 per cent and 5 per cent respectively. As a result of improved method of production the overall direct labour efficiency will increased by 12 per cent buy the wage rate will go up by 5 per cent. The fixed overheads are also expected to increase by Rs. 1,25,000.

The technical director states that the same level of output as obtained in 1986 should be maintained in 1987 and efforts should be made to maintain the same level of profit by suitable increasing the selling price

The marketing director states that the market will not absorb any increasing in the selling price. On the other hand he proposes that publicity involving advertisement expenses in the proportions will increase the quantity of sales as under:

Advertisement expenses (Rs.)	80,000	1,94,000	3,20,000	4,60,000
Additional units of sales	2,000	4,000	6,000	8,000

Required:

1. Present an income statement for the year 1986
2. Find the revised price and percentage of increase in the price for 1987 if the Technical Director's Views are accepted.
3. Evaluate the four alternative proposals put fourth by the Marketing Director, determines the best Output level to the budgeted and prepare an overall income statement for 1987 at the level of output.

Question: 16

A large manufacturing company engages itself in production of basic chemicals. The capacity of its plant is 75,000 tonnes per annum but it operates at 80% level in view of paucity of demands. In past the company ventured to raise production and export the same: but found it not profitable. The company is required to import certain chemicals and maintenance spares, the annual requirement in foreign exchange being Rs. 6 Crores on a production of 60,000 tonnes. This cost is totally variable. So long company did not face any problem in procurement of these materials, as foreign exchange was always available following normal licensing procedures.

However on account of recent Government policy, it is not possible at all to get foreign exchange for imports. The company has either to export and get entitled to 30% foreign exchange earned to finance its imports or to buy Exim Scripts in open market. The company expects the premia payable at 50% of the value of the Exim Scripts.

Since there is ample scope to produce additional 15,000 tonnes and export the same the management is considering the possibility there to finance its imports. Based on the detailed analysis and behavior of different cost element, following cost profile is available.

Cost element	Behavior in cost element	Rs./Tonne
Raw material & chemical	Fully variable	12,500
Packing / forwarding	Fully variable	500
Steam power & other utilizes	60% variable	1,500
Wages & Salaries	50% variable	400
Store, spares & maintenance	2/3 fixed	600
Overheads	20% variable	500
Depreciation	Fixed	900
Total		16,900
Gross margin before interest		3,100
Selling price		20,000

In view of the recent adjustment in Dollar/Rupee parity, the export price that can be realized FOB Bombay is placed at Rs. 14,000/ tones. Other costs on interest, special export packing and other incidental costs is estimated at Rs. 1,000 per tonne, showing the net realization on export at Rs. 13,000/tonne.

You are required to advice the management whether (a) to export additional 15,000 tonnes and be entitled to 30% foreign exchange so as to finance its import requirement or (b) to buy Exim Scripts a premium of 50% and continue to operate at 80% capacity as hitherto.

Indicate comparative economic and cost/benefit analysis of both the alternatives, ignore foreign exchange rate fluctuations.

Also suggest the adjustment to be effected in local prices to retain the same

Answer: Rs. 16,900/- RS. 16,400/- Rs. 12,300/- Rs. 115 lakhs/-

Question: 17

A company which works at a capacity utilization of 60% expects its turnover of the year 1988-89 at Rs. 86.40 lacs. If the company works at 100% capacity, the cost relationship will as made:

Factory cost: Tow-thirds of sales value
 Prime cost : 75% of factory cost

Selling & administration Expenses (75% variable) 20 % of sales value, the factory overhead will vary according to the operating capacity in the following manner.

Operating capacity	60%	80%	100%	120%
Factory overhead (Rs. Lacs)	19.80	21.60	24.00	30.00

The company receives an offer from abroad for a value of Rs. 19.80 lacs. The prime cost of this order is estimated at Rs. 12 lacs and the selling and administration expenses applicable to this order Rs. 90,000. This order will occupy 40% of the capacity of the plant.

The marketing Director estimates that by the time the new order materializes, the company's own sales will increase to 80% of the capacity. Required: Prepare statement to show:

1. Profitability at the present capacity utilization of 60%
2. Profitability based on the marketing director's estimates of increase in the company's own sales to 80% capacity.
3. Evaluation of the export order with advice as to whether the company should accept the export or not.

Answer: 43.20, cost of goods sold 83.16, cost of goods sold 103.68, cost of sales 21.30/-, profit/loss- 1920, 3.24, 11.52, (1.50)

Question: 18

A firm furnished the following information:

Capacity in units	Units Cost (Rs.)	Units price (Rs.)
2,000	40	100
3,000	35	95
4,000	34	94
5,000	32	-
6,000	31	-

At present the firm is operating at 4,000 units capacity and has received an order for 2,000 units from an export market at Rs. 28 per unit. Should the order be accepted.

CHAPTER-3

SPARE – CAPACITY

Question: 1

CA Final, Nov. 1983

Forward Foundry Ltd. is feeling the effects of a general recession in the industry. Its budget for the coming half year is on an output of only 500 tonnes of casting a month's which is less than half its capacity. The price of casting varies with the composition of the metal and the shape of the mould, but they average Rs. 175 a tonne. The following details are the Monthly Production Cost Budget at 500 tonne level.

	Core making	Melting and pouring	Moulding	Cleaning and grinding
Labour	Rs. 10,000	Rs. 16,000	Rs. 6,000	Rs. 4,500
Variable overhead	3,000	1,000	1,000	1,000
Fixed overhead	<u>5,000</u>	<u>9,000</u>	<u>2,000</u>	<u>1,000</u>
	<u>18,000</u>	<u>26,000</u>	<u>9,000</u>	<u>6,500</u>
Labour and O/H per direct hour	9.00	6.50	6.00	5.20

Operation at this level brought the company to the brink of break-even. It is feared that if the lack of work continues, the company may have to lay off some of the most highly skilled workers whom it would be difficult to get back when the volume picks up later on. No wonder, the Works Manager at this juncture, welcome and order for 90,000 castings, each weighing about 40 lbs., to be delivered on a regular schedule during the next six months. As the immediate concern of the Work Manager is to keep his work force occupied, he does not want to lose the order and is ready to recommend a quotation on a no-profit and no-loss basis.

Materials required would cost Re. 1 per casting after deducting scrap credits. The direct labour hours per casting required for each department would be:

Core making	0.09
Melting and pouring	0.15
Moulding	0.06
Cleaning and grinding	0.06

Variable overhead would bear a normal relationship to labour cost in the melting and pouring department and in the moulding department. In core making, cleaning and grinding, however, the extra requirements would not be accompanied by proportionate increase in variable overhead. Variable overhead would increase by Rs. 1.20 for every additional labour hour in core making and by 30 paise for every additional labour hour in cleaning and grinding. Standard wage rates are in operation in each department and no labour variances are anticipated.

To handle an order as large as this, certain, increase in factory overheads would be necessary amounting to Rs. 1,000 a month for all departments put together. Production for this order would be spread evenly over the six months period.

- Prepare a revised monthly Labour and Overhead Cost Budget, reflecting the addition of this order.
- Determine the lowest price at which quotation can be given for 90,000 castings without incurring a loss.

Question: 2

CA Final, Nov. 1987

Standatase Corporation are currently selling 5,000 units of their product per month, which is only 40% of the normal productive capacity of the plant of the company. The selling price of Rs. 12.50 per unit of their product does not give them any profit.

An analysis of the cost of the company for the month of June during which only 4,000 units were produced and 5,000 sold, shows the following:

	Rs.
Direct labour	9,600
Superintendent's Salary	4,000
Power	2,500
Direct Materials	800
Purchased Components	4,000
Depreciation of Building	2,400
Maintenance of Building	1,500
Electricity Charges	300
Indirect Labour	248
Maintenance Supplies	2,000
Depreciation of Machinery	800
Repairs to Machinery	2,640
Sales Manager's Salary	500
Salesman's Commission	4,000
Travelling Apportioned	19,000
Packing and Forwarding	252
Bad Debts	2,500
Advertising	625
General Administration	500
	<u>5,835</u>
	<u>64,000</u>

Marchon Ltd. had offered to buy 5,000 units of his product per month from Standease Corporation. The modification that is required is very insignificant and the unit will be used as a component part in the manufacture of marchon Ltd. the price offered is Rs. 10 per unit and the company is ready to enter into a one year contract. The management of Standease Corporation does not expect that there will be an improvement in the business within next year and there is no fear that the sale of the units of Marchon Ltd. would reduce the present volume of sales to consumers, as the units are going to be used by Marchon Ltd. only as component parts in their manufacture. But the management of Standease Corporation are very reluctant to accept the order as they are losing at the present price of Rs. 12.50 and the order if accepted will only increase the losses.

You are required to prepare an analysis of costs to demonstrate that the order can be accepted. All items of costs are either completely fixed or completely variable except the following:

Power	80% Variable
Indirect Labour	40% Fixed
Maintenance Supplies	50% Fixed
Repairs of Machinery	20% Fixed

Question: 3

A Company manufacturing agricultural Tractors has a capacity to produce 6,000 Tractors annually. The Capital employed in the project as on date is Rs. 20 Crores. With increasing cost of production and reducing margins the company is fast narrowing its Margin of Safety. The Return on Capital Employed fell from 10% in the previous year to 6% in the current year i.e. the current year profit is Rs. 1.20 crores. The company wants to maintain the original cut off rate of 12% and various possibilities have been examined for this purpose.

The company is at present manufacturing and marketing 6,000. Tractors annually though there is imbalance in the plant. The company has the following major production departments with percentage capacity utilization for the present production:

Production Deptt.	Capacity Utilizing
Machine shop	75%
Assembly shop	100%
Heat treatment shop	75%
Including hardening	50%

The company operates a single shift of 8 hours per day on an average for 300 days in a year. For technical reasons the plant will have to operate on single shift basis only. The two alternatives, which have emerged after a detailed study, are :

- (a) To hire out the surplus capacity in the production shops for which constant demand exists. The following income and expenditure projections are drawn out:

	Hire charges per hour Rs.	Incremental cost per hour Rs.
Machine shop	10,000	2,000
Heat treatment	7,500	1,500
Induction hardening	5,000	1,000

- (b) To increasing the installed capacity to 8,000 tractors by spending Rs. 2 crores on additional machinery for the assembly shop. The incremental revenue from the additional sale will be Rs. 5,000 per Tractor. The cost of additional finance will be 12% being the cost of existing capital employed. In addition tax benefits on an average will work out to 1% of additional investment.

You are required to work out the profitability, i.e. average rate of return of the two alternatives and recommend the better alternative.

Answer: (a) Total profit = 2,52,00,000; (b) Rate of Return on capital employed = 12.6%
(c) profit = 2,54,00,000, © Rate of Return on capital employed = 11.55%

Question: 4

CA Final, May 2000

AB Ltd. manufacture product 'X'. the company operates a single shift of 8 hours for 300 days in a year. The capital employed in the business is Rs. 18 crores. The manufacturing operations of the company comprise of four production departments. The company at present produces 9,000 units of product 'X' at maximum capacity. However, the capacity utilisation of all the four departments are not equal and the present individual capacity utilization are as under:

Department	Capacity Utilisation %
A	75
B	100
C	70
D	50

The present return on capital of the company has gone down to 10% from the earlier cut-off rate of 15% due to increased cost of production.

As the company cannot operate more than one shift, the management is considering two alternative proposals to increase the return on capital employed.

The two alternatives are:

Alternative I

To hire out the surplus capacity of departments A, C and D. The cost and revenue projections are as under:

Department	Hire charges per hour Rs.	Incremental cost per hour Rs.
A	2,500	2,000
C	1,800	1,500
D	1,600	1,200

Alternative II

To increase the installed capacity of the factory to 12,000 units by adding plant and machinery in department B at a capital cost of Rs. 4 crore. Any balance surplus capacity in other departments after meeting the increased volume to be hired out as per alternative I. the additional units would fetch an incremental revenue of Rs. 1,600 per unit.

You are required to evaluate the two proposals and suggest the management which of the two proposals to be accepted.

Answer: ROI for Alternative I is 10.533% and Alternative II is 10.53%.

Question: 5

CA Final, May 2000

Unique Products manufactures and sells in a year 20,000 units of a particular product to definite customers at a price of Rs. 100 per unit. The concern has a capacity to produce 25,000 units of the product per annum. To produce beyond 25,000 units per annum, the concern will have to install a new equipment at a cost of Rs. 15 lakh. The equipment will have a life span of 10 years and will have no residual value. There is an offer from a client to purchase 10,000 units of the product regularly at a price of Rs. 90 per unit. The order, if accepted, will have to be over and above the existing level of production of 20,000 units.

The cost structure is as under:

	Per Unit Rs.
Direct Material	30
Direct Labour	20
Variable Overhead	10
Profit	20

During the coming year, it has been estimated that the cost of direct material, as compared to the current year will increase by 10%. Because of certain wage agreement direct labour cost will increase by 25%. Fixed overheads will increase by 10%. If the new order for 10,000 units is accepted, fixed overheads will increase further by Rs. 60,000 due to increased administrative charges.

You are required to analyze whether the concern should accept the order or instead of that try to secure order for the balance unused capacity, as available now, through some sales promotion expenses which will be Rs. 50,000 per annum. Ignore financial charges for the new investment.

Answer: It is advisable to produce and sell 25,000 units @ Rs. 100 per units and utilize full production capacity, as only then the profit would be maximum i.e. Rs. 3,10,000.

Question: 6

CA Final, May 2004

A company manufactures two products. Each product passes through two departments A and B before it becomes a finished product. The data for year are as under :

Products	Aristocrat	Deluxe
(i) Maximum sales potential in units	7,400	10,000
(ii) Product unit data:		
Selling price per unit	Rs. 90	Rs. 80
Machine hour per unit:		
Dept. A Hours	0.50	0.30
Dept. B Hours	0.40	0.45

- (iii) Maximum capacity of Department A is 3,400 hours and of Department B is 3,840 hours.
- (iv) Maximum quantity of direct materials available is 17,000 kg. Each product requires 2 kg. of direct materials. The purchase price of the direct materials is Rs. 5 per kg.
- (v) Variable costs are budgeted at Rs. 50 per hour for Department A and Rs. 60 per hour for department B.

In view of the aforesaid production capacity constraints, the company has decided to product only one of the two products during the year under review.

Required:

- (i) Which of the two products should be produce and sold in the year under review to maximize the profit. State the number of units of that product and the resultant contribution.
- (ii) The surplus capacity available in department A or Department B after manufacture of either aristocrat or Deluxe is proposed to be hired out to earn a contribution of Rs. 40 per hour in the case of Department A and Rs. 60 per hour in the case of Department B. prepare a statement to show whether Aristocrat of Deluxe should now be produced to maximize the total contribution. Calculate such total contribution.
- (iii) The company has been advised to produce 4,250 units of each product and also to hire out the surplus capacity of Department A and /or Department B. you are required to examine the feasibility of this proposal and to prepare a budget analysis showing to total contribution for the year.

Answer: (i) 8,500 units of Deluxe model should be produced; (ii) Total contribution: Aristocrat Rs. 2,78,000, Deluxe Rs. 2,72,00; (iii) Total contribution Rs. 2,64,400.

Question: 7

CA Final, May 2000

Panchwati Cement Ltd. produce '43 grade' cement for which the company has an assured market. The output for 2004 has been budgeted at 1,80,000 units at 90% capacity utilisation. The cost sheet based on output (per unit) is as follows:

	Rs.
Selling price	130
Direct material	30
Component 'EH'	9.40
Direct wages @ Rs. 7 per hour	28
Factory overhead (50% fixed)	24
Selling and distribution overheads (75% variable)	16
Administrative overhead (fixed)	5

The factory overheads are applied on the basis of direct labour hours. To utilise the idle capacity and to improve the profitability of the company, the following proposals were put up before the Board of Directors for consideration:

- (i) And order has been received from abroad for 500 units of product '53 grade' cement per month at Rs. 175 per unit. The cost data are:
 Direct material Rs. 56 per unit, direct labour 10 hours per unit, selling and distribution overhead applicable to this product order is Rs. 14 per unit and variable factory overhead are chargeable on the basis of direct labour hours.
- (ii) The company at present manufacture component 'EH' one unit of which is required for each unit of product '43 grade'. The cost details for 15,000 units of component 'EH' are as follows:

	Rs.
Direct materials	30,000
Direct labour	52,500
Variable overheads	25,500
Fixed overheads	33,000
Total	1,41,000

The component 'EH' however is available for purchase at the market at Rs. 7.90 per unit.

- (iii) In the event of company deciding to purchase the component 'EH' from market, the company has two alternative for the use of the capacity so released, which are as under:
 - (a) Rent out the released capacity at Re. 1 per hour.

- (b) Manufacture component 'GYP' which can be sold at Rs. 8 per unit. The cost data of this component for 15,000 units are:

	Rs.
Direct materials	42,000
Direct labour	31,500
Factory variable overheads	13,500
Other variable overheads	25,500
Total	1,12,500

Required:

- Prepare a statement showing profitability of the company envisaged in the budget.
- Evaluate the export order and state whether is acceptable or not.
- Make an appraisal of proposal to manufacture component 'EH' and state whether the component 'EH' should be manufactured in the factory or purchased from the market. Assume that on alternative use of spare capacity is available.
- Evaluate the alternative use of the spare capacity and state whether to manufacture or buy the component 'EH' and if your decision is to buy the component 'EH', which of the two alternatives for the use of spare capacity will you prefer?

Answer: (i) Profit Rs. 31,68,000 (ii) Acceptable (iii) 'EH' should be manufactured in the factory (iv) 'EH' should be purchased and 'GYP' should be manufactured.

Question: 8

CA Final, Nov. 2000

A Co. Ltd. manufactured several different styles of jewellery cases. Management estimates that during the third quarter, the company will be operating at 80 per cent of the normal capacity. Because the company desires a higher utilization of plant capacity, the company will consider a special order.

The company has received special order inquiries from two companies. The first order is from JCP Co. Ltd., which would like to market a jewellery cases similar to one of A Co. Ltd.'s jewellery cases. JCP jewellery case would be marketed under JCP's own label. JCP Co. Ltd. has offered A Co. Ltd. Rs. 57.50 per jewellery case for 20,000 cases to be shipped by the last date of the quarter. The cost data for A Co. Ltd. jewellery case that would be similar to the specifications of JCP special order are as follows:

	Rs.
Regular selling price per unit	90
Costs per unit	
Raw materials	25
Direct Labour	0.5 hour @ Rs. 60
Overhead	0.25 machine hour @ Rs. 40
Total costs	<u>65</u>

According to the specifications provided by JCP Co. Ltd., the special order case requires less expensive raw materials. Consequently the raw materials will only cost Rs. 22.50 per case. Management has estimated that the remaining costs, labour time and machine time will be the same as for A C. Ltd. jewellery case. The second special order was submitted by K Co. Ltd. for 7,500 jewellery cases at Rs/ 75 per case. These jewellery cases. Like the JCP cases, would be marketed under K label and have to be shipped by the last date of the quarter. However, the K jewellery case is different from any jewellery case in the A Co. Ltd. line. The estimated per unit cost of this case are as follows:

	Rs.
Raw materials	32.50

Direct Labour	0.5 hour @ Rs. 60	30.00
Overhead	0.5 machine hour @ Rs. 40	<u>20.00</u>
Total costs		<u>82.50</u>

In addition, A Co. Ltd. will incur Rs. 15,000 in additional setup costs and will have to purchase a Rs. 25,000 special device to manufacture these cases; this device will be discarded once the special order is completed.

The A Co. Ltd.'s manufacturing capabilities are limited to the total machine hours available. The plant capacity under normal operations is 90,000 machine hours per year or 7,500 machine hours per month. The budgeted fixed overhead for the current year amounts to Rs. 21,60,000. All manufacturing overhead costs are applied to production on the basis of machine hours at Rs. 40 per hour.

A Co. Ltd. will have the entire quarter to work on the special orders. Management does not expect any repeat sales to be generated from either special order. Company practice precludes from subcontracting any portion of an order, when special orders are not expected to generate repeat sales.

Required: Should A Co. Ltd. accept either special order? Justify your answer and show the calculations.

Question: 9

CA Final, Nov. 2004

Panchwati Cement Ltd. produce '43 grade' cement for which the company has an assured market. The output for 2004 has been budgeted at 1,80,000 units at 90% capacity utilisation. The cost sheet based on output (per unit) is as follows:

	Rs.
Selling price	130
Direct material	30
Component 'EH'	9.40
Direct wages @ Rs. 7 per hour	28
Factory overhead (50% fixed)	24
Selling and distribution overheads (75% variable)	16
Administrative overhead (fixed)	5

The factory overheads are applied on the basis of direct labour hours. To utilise the idle capacity and to improve the profitability of the company, the following proposals were put up before the Board of Directors for consideration:

- (iv) An order has been received from abroad for 500 units of product '53 grade' cement per month at Rs. 175 per unit. The cost data are:
 Direct material Rs. 56 per unit, direct labour 10 hours per unit, selling and distribution overhead applicable to this product order is Rs. 14 per unit and variable factory overhead are chargeable on the basis of direct labour hours.
- (v) The company at present manufacture component 'EH' one unit of which is required for each unit of product '43 grade'. The cost details for 15,000 units of component 'EH' are as follows:

	Rs.
Direct materials	30,000
Direct labour	52,500
Variable overheads	25,500
Fixed overheads	33,000
Total	1,41,000

The component 'EH' however is available for purchase at the market at Rs. 7.90 per unit.

- (vi) In the event of company deciding to purchase the component 'EH' from market, the company has two alternative for the use of the capacity so released, which are as under:
- (c) Rent out the released capacity at Re. 1 per hour.
- (d) Manufacture component 'GYP' which can be sold at Rs. 8 per unit. The cost data of this component for 15,000 units are:

	Rs.
Direct materials	42,000
Direct labour	31,500
Factory variable overheads	13,500
Other variable overheads	25,500
Total	1,12,500

Required:

- (v) Prepare a statement showing profitability of the company envisaged in the budget.
- (vi) Evaluate the export order and state whether is acceptable or not.
- (vii) Make an appraisal of proposal to manufacture component 'EH' and state whether the component 'EH' should be manufactured in the factory or purchased from the market. Assume that on alternative use of spare capacity is available.
- (viii) Evaluate the alternative use of the spare capacity and state whether to manufacture or buy the component 'EH' and if your decision is to buy the component 'Eh', which of the tow alternatives for the use of spare capacity will you prefer?

Answer: (i) Profit Rs. 31,68,000 (ii) Acceptable (iii) 'EH' should be manufactured in the factory (iv) 'EH' should be purchased and 'GYP' should be manufactured.

Chapter – 4

Evaluation of Export Proposal & Export Pricing

Question : 1.

Somesh of Agra presently operates its plant at 80% of the normal capacity to manufacture a product only to meet the demand of Government of Tamil Nadu under a rate contract.

He supplies the product for Rs. 4,00,000 and earns a profit margin of 20% on sales realization. Direct cost per unit is constant. The indirect costs as per his budget projection are:

	20,000 units	22,500 units	25,000 units
	(80% capacity)	(90% capacity)	(100% capacity)
Variable	80,000	90,000	1,00,000
Semi-variable	40,000	42,500	45,000
Fixed	80,000	80,000	80,000

He has received an export order for the product equal to 20% of its present operations. Additional packing charges on this order will be Rs. 1,000.

Arrive at the price to be quoted for the export order to give him a profit margin of 10% on the export price.

Question : 2.

A company produce a single product which is sold by it presently in the domestic market at Rs. 75 per unit. The present production and sales is 40,000 units per month representing 50% of the capacity available. The cost data of the product are as under :

Variable cost per unit Rs. 50

Fixed costs per month Rs. 10 lakhs.

To improve the profitability, the management has three proposals on hand as under:

- to accept an export supply order for 30,000 units per month at a reduced price of Rs. 60 per unit, incurring additional variable costs of Rs. 5 per unit towards export packing, duties, etc.
- to increase the domestic market sales by selling to a domestic chain store 30,000 units at Rs. 55 per unit, retaining the existing sales at the existing price.
- to reduce the selling price for the increased domestic sales as advised by the sales department as under:

Reduce selling price per unit by Rs.	Increase in sales expected (in units)
5	10,000
8	30,000
11	35,000

Prepare a table to present the results of the above proposals and give your comments and advice on the proposals.

Question : 3.

Pieco Engineering company has received an once-off export order for its sole products that would required the use of half of the factory's total capacity, which is estimated at 4 lakh units per annum. The condition of the export order is that it has to be accepted in full: acceptance of part quantity is not allowed.

The factory is currently operating at 60% level to meet the demand of its domestic customers. As against the current Price of Rs. 6.00 per unit, the export offer is Rs. 4.70 per unit, which is less than the total cost of current production.

The cost breakdown is given below:

Direct Material	2.50 per unit
Direct Labour	1.00 per unit
Variable Expenses	0.50 per unit
Fixed Overhead	1.00 per unit
Total Cost	5.00 per unit

The company has the following options:

- (A) Accept the export order and cut back domestic sales as necessary
- (B) Remove the capacity constraint by installing necessary balancing equipment and also by working overtime to meet both domestic and export demand. This will increase fixed overheads by Rs. 15,000 annually, and additional cost for overtime work will amount to Rs 40,000 for the year.
- (C) Appoint a sub-contractor to manufacture the additional requirement and meet the domestic and export requirement in full by supplying raw materials, paying a conversion charge @ Rs. 2.00 per unit and appointing a supervisor at a salary of Rs. 3,000 per month for checking and quality of the product and controlling operations at the manufacturing unit
- (D) Refuse the order.

Required :

- (i) a statement of costs and profit under each of the above four options:
- (ii) your recommendation, with reasons as to which of these options the company should decide upon.

Question : 4.

A company currently operating at 80% capacity has the following particulars:

Sales	32,00,000
Direct Material	10,00,000
Direct Labour	4,00,000
Variable Overheads	2,00,000
Fixed Overheads	13,00,000

An export order has been received that would utilise half the capacity of the factory. The order cannot be split, i.e. it has either to be taken in full and executed at 10% below the normal domestic prices. or reject totally.

The alternatives available to the management are:

1. Reject the order and continue with the domestic sales only ; (as at present), or
2. Accept the order, split capacity between overseas and domestic sales and turn away excess domestic demand, or
3. Increase capacity so as to accept the export order and maintain the present domestic sales by :
 - (a) Buying equipment that will increase capacity by 10%. This will result in an increase of Rs. 1,00,000 in Fixed cost and .
 - (b) Work overtime to meet balance of required capacity. In that case labour will be paid at one and a half times the normal wage rate.

Prepare a comparative statement of profitability and suggest the best alternative.

Question : 5.

A Ltd., operating a 75% level of activity produces and sells two products X and Y. The cost sheets of these two products are as under:

	Product X 3,000 Rs. per unit	Product Y 2,000 Rs. per unit
Units produced and sold		
Direct Material	10	20
Direct Labour	20	20
Factory Overheads (40% fixed)	25	15
Administration and selling Overheads (60% fixed)	40	25
Total cost per unit	95	80
Selling price per unit	115	95

Factory overheads are absorbed on the basis of machine hour which is the limiting factor. The machine hour rate is Rs. 10 per hour.

The company receives an offer from Japan for the purchase of Product X at a price of Rs. 87.50 per unit. Alternatively, the company has another offer from Bangkok for the purchase of product Y at a price of Rs. 77.50 per unit. In both the cases, a special packing charge of Rs. 2.50 per unit has to be borne by the company. The company accepts either of the two export orders by utilizing the balance of 25% of its capacity.

Advise the company with detailed working as to which proposal should be accepted and prepare a statement showing the overall profitability of the company after incorporating the export proposal suggested by you.

Question : 6.

A company is at present working at 90% of its capacity and producing 13,500 units per annum. It operates a Flexible Budgetary control system. The following figures are obtained from its budget:

Capacity utilisation	
90%	100%

Sales	15,00,000	16,00,000
Fixed expenses	3,00,500	3,00,600
Semi-fixed expenses	94,500	1,00,500
Variable expenses	1,45,000	1,49,500
Units manufactured	13,500	15,000

Labour and material costs per units are constant under the present conditions. Profit margin is 10%.

- You are required to determine the differential cost of producing 1,500 units by increasing capacity utilisation to 100 per cent.
- what would you recommend as an export price for these 1,500 units after considering that overseas prices are much lower than inland prices?

Question : 7.

A large manufacturer has planned his level of operation at 50% of his plant capacity of 30,000 units. His expenses are estimated of follows, if 50% of the plant capacity is utilised.

Direct material	Rs. 8,280
Direct wages	Rs. 11,160
Variable and other manufacturing expenses	Rs. 3,960
Total fixed expenses irrespective of capacity utilisation	Rs. 6,000

The expected selling price in the domestic market is Rs. 2 per unit. Recently, the manufacturer has received a trade enquiry from an overseas organization interested in purchasing 6,000 units at a price of Rs. 1.45 per unit.

As a professional management accountant what would be your suggestion regarding acceptance or rejection of the offer? Support your suggestion with suitable quantitative information.

Question : 8.

A large manufacturing company engages itself in production of basic chemicals. The capacity of its plant is 75,000 tonnes per annum but it operates at 80% level in view of paucity of demands. In past the company ventured to raise production and export the same: but found it not profitable.

The company is required to import certain chemicals and maintenance spares, the annual requirement in foreign exchange being Rs. 6 crores on a production of 60,000 tonnes. This cost is totally variable. So long company did not face any problem in procurement of these material as foreign exchange was always available following normal licensing procedures.

However, on account of recent Government policy, it is not possible at all to get foreign exchange for imports. The company has either to export and get entitled to 30% foreign exchange earned to finance its imports or to buy Exim Scrips in open market. The company expects the premium payable at 50% of the value of the Exim Scrips.

Since there is ample scope to produce additional 15,000 tonnes and export the same, the management is considering the possibility thereof to finance its imports.

Based on the detailed analysis and behavior of different cost element, following cost profile is available:

Cost Element	Behavior of cost element	Rs./Tonne
Raw materials and chemicals	Fully variable	12,500
Packing/Forwarding	Fully variable	500
Steam, power and other utilities	60% variable	1,500
Wages and salaries	50%	400
Stores, spares and maintenance	2/3	600
Overhead	20% variable	500
Depreciation	Fixed	900
Total		16,900
Gross margin before interest/taxes		3,100
Selling price		20,000

In view of the recent adjustment in Dollar/Rupee parity, the export price that can be realized FOB Bombay is placed at Rs. 14,000 tonnes. Other costs on interest, special export packing and other incidental costs is estimated at Rs. 1,000 per tonne, showing the net realization on export at Rs. 13,000/tonne.

You are required to advise the management whether (a) to export additional 15,000 tonnes and be entitled to 30% foreign exchange so as to finance its import requirement or (b) to buy Exim Scrips a premium of 50% and continue to operate at 80% capacity as hitherto.

Indicate comparative economic and cost/benefit analysis of both the alternatives. Ignore foreign exchange rate rate fluctuations.

Also suggest the adjustment to be effected in local prices to retain the same gross margin.

Question:9

Texomat private Limited has been manufacturing track suits for athletes. Currently its output is around 70% of its rated capacity of 19,000 units per annum. One exporter has approved the sample and has offered to buy 5,000 units at a special price of Rs. 150 per suit. At present, the company has been selling the tracksuit @ Rs. 210 the standard cost per unit is as under :

	Rs. In lakhs
(i) Cloth and other material	82
(ii) Labour	25
(iii) Fixed cost	42
(iv) Administration, variable cost	<u>11</u>
Total cost	<u>160</u>

- Should the company accept the offer?
- What would be your advice if the exporter offers to buy 10,000 units instead of 5,000 units?
- What is the minimum quotation for accepting the order?
- If order is offer by Local Market consumer at Rs. 118 for 5,700 units could the order be accepted.

Answer: No as it will affect the other Local Market Consumer)

Question:10

Perfect piston Ltd. produces 60,000 pistons per annum for its parent company.

Perfect Motors Ltd. The pistons are sold to perfect Motors at Rs. 200 per unit. The variable cost per piston is Rs. 180. The annual fixed cost of perfect pistons Ltd. is Rs. 15 lakhs and it is currently operating at 60 % capacity.

The company desires to respond to an export enquiry for 30,000 pistons of the type of its are currently manufacturing. The company aim is to improve capacity utilization and avoid loss.

You have to take note of the following benefits that will accrue to the export transactions, while determining the R.O.B. price to be quoted.

- (a) Export incentive by way of cash assistance at 10% of F.O.B. value of exports.
- (b) Reimbursement of excise duty on manufacturing inputs by way of 5% drawback of duty on F.O.B. value of exports.
- (c) Entitlement of import license to the extent of 10% on F.O.B. value of exports. The import license can either be sold at a premium of 100% or it can be utilized to import certain critical auto components that will yield a 30% profit on cost.
- (d) Recommend there bare minimum price that the company should quote in order to break-even, assuring:
 1. It sells the import license in the market.
 2. It imports components against the license and sells them for profit.

Answer: 152 Rs./-, 161.2 Rs./-

Question: 11

Profitability arising out of discontinuance of product, export total production and replacing existing machinery). Shiplon Products Ltd. Manufactures 3 different products.

The relevant data of these products are as under:

Name of the product	Cream	Pomade	Jelly
Production capacity (units)	5,000	7,000	8,100
Machine hours per unit	1	3	4
Variable cost per unit Rs.	3.00	2.50	3.50
Selling price – Rs./Unit	4.00	5.50	6.00

The total fixed overheads at current capacity level are Rs. 40,000 per annum.

The company have various alternatives for improving profitability as given below:

- (a) To stop the production of Jelly and use the released capacity for producing Pomade. The machine for both the products are common. However cream is produced on a special purpose machine.
- (b) To export the total production of Jelly at current price. On export the following additional revenue is expected:
 - (i) 8% Duty Drawback on export price.
 - (ii) 12% Cash Compensatory Support against an export scheme of government
 - (iii) 5% Replenishment License which can be sold in market at a premium of 80%
- (c) To replace the conventional machine used for jelly by a special purpose machine, which will reduce the production time from 4 hours to 3 hours per unit. Due to this change Rs. 0.50 per unit will reduce the variable cost of jelly. The released machine will be used for producing Pomade. This proposal will entail an additional burden of fixed cost to the tune of Rs. 32,000 per annum.

Please advise the management about the right choice of an Alternative so as to maximize profits.

Question: 12

A company manufacturing electric motors at a price of Rs. 6,900 each made up as under:

	Rs.
Direct material	3,200
Direct labour	400
Variable overheads	1,000
Fixed overheads	200
Depreciation	200
Variable selling overheads	100
Royalty	200
Profit	1,000
	6,300
Central Excise Duty	600
	6,900

- (i) A foreign buyer has offered to buy 200 such motors at Rs. 5,000 each. As a Cost Accountant of the company would you advise acceptance of the offer?
- (ii) What should the company quote for a motor to be purchased by a company under the same management if it should be at cost.

Question: 13

A company which works at a capacity utilization of 60% expects its turnover for the year 1988-89 at RS. 86.40 lacs. If the company works at 100% capacity, the sales-cost relationship will as made:

Factory Cost: Two-thirds of sales value

Prime cost: 75% of factory cost

Selling and Administration Expenses (75% variable): 20% of sales value.

The factory overheads will vary according to the Operating Capacity in the following manner.

Operating capacity	60%	80%	100%	120%
Factory overhead (Rs. Lacs)	19.80	21.60	24.00	30.00

The company receives an offer from abroad for a value of Rs. 19.80 lacs. The prime cost of this order is estimated at Rs. 12 lacs and the selling and administration expenses applicable to this order Rs. 90,000. This order will occupy 40% of the capacity of the plant.

The Marketing Director estimates that by the time the new order materializes, the company's own sales will increase to 80% of the capacity. Required: **Prepare statement to show.**

- (i) Profitability at the present capacity utilization of 60%
- (ii) Profitability based on the Marketing Director's estimates of increase in the Company's own sales to 80% capacity.
- (iii) Evaluation of the export order with advice as to whether the company should accept the export or not.

Question : 14

The following data is extracted from the budget documents of Rao Ltd., which pertains to the calendar year 1984:

Capacity Utilization	60%	70%	80%	90%	100%	101-120%
Factory expenses	Rs. 45,000	45,000	50,000	50,000	60,000	70,000
Fixed factory costs	Rs. 60,000	60,000	60,000	60,000	65,000	65,000
Office overheads	Rs. 40,000	40,000	40,000	40,000	40,000	40,000

Installed capacity of the plant: 10,000 tonnes per annum which could be expanded up to a margin of 20% by incurring additional expenses of Rs. 10,000

Selling and distribution costs including commission to distributors account for 10 per cent of the sales value.

Up to April 1984, the company has been able to market completely its production fully locally at a unit realization value of Rs. 80 per tonne. Monthly production of 750 tonnes is expected to be maintained throughout the year which will satisfy the local market. The company will be able to maintain its sale price locally. Direct Labour, direct material and direct expenses account for 60 per cent of the price of the product.

The company has received an enquiry from abroad for manufacture and supply of 30,000 tonnes at US\$ 6 per tonne c.i.f. commission payable to a foreign agent will be 50 cents per tonne and insurance and freight charges are estimated at 50 cent per tonne. The export order will fetch the company an export incentive licence for 20 per cent of the quantum of exports, the current market value of the licence, which can be transferred freely, is Rs. 60 per tonne.

Kindly indicate whether the export order can be accepted by the company.

Workings are to form part of your answer.

Assume: US Dollar is equivalent to Rs. 10

Question: .15

A manufacturing unit is producing 15,000 containers per annum. There is good demand in local as well as in export market. The unit is thinking of replacing the present production machine by an automatic machine. Due to this change, the production will be doubled. The present selling price of each container is Rs. 20. The new machine will be operated by one operator while present machine is operated by two operators. The old machine has book value of Rs. 4,00,000 with no scrap value of Rs. 10,000. The units are charging 10% depreciation. The cost structure of containers is as follows:

	Rs. Per unit
Direct material	6.00
Direct labour	4.00
Variable overheads	2.00
Fixed overheads (including depreciation)	2.00

After the new machine is commissioned there will be an increase in fixed overheads (excluding depreciation) by Rs. 15,000 per annum.

- Calculate present and future profitability assuming no change in selling price.
- In case the local market demand falls and the new machine is having 80% idle capacity, will it be feasible to offer the product in export market at a selling price Rs. 10.50 per unit? Will your recommendations differ if the export price is Rs. 9.50 per container as against Rs. 10.50?

Question: 16**CA Final May 2000**

A firm furnishes the following information

Capacity in Units	Unit Cost Rs.	Unit Price Rs.
2,000	40	100
3,000	35	95
4,000	34	94
5,000	32	-
6,000	31	-

At present the firm is operating at 4,000 units' capacity and has received an order for 2,000 units from an export market at Rs. 28 per unit. Should the order be accepted?

Answer: The firm should accept the order

Question: 17**CA Final Nov. 2007**

X limited having an installed capacity of one lakh units of a product is currently operating at 70 per cent utilization. At current level of input prices, the F.O.B. costs per unit, taking credit for applicable export incentive workout as follows:

Capacity Utilization	70%	80%	90%	100%
FOB Cost per unit(Rs.)	97	92	87	82

The company has received three Foreign offers as under:

Source A: 5,000 units @ Rs. 55 per unit FOB

Source B: 10,000 units @ Rs. 52 per unit FOB

Source C: 10,000 units @ Rs. 51 per unit FOB

Required:

Advice the company whether it should accept any or all the export orders.

Answer: all the 3 proposal should be accepted as they will result in a profit of Rs. 80,000 and idle capacity of 5000 units.

Chapter – 5

Make or Buy Decision

Question:1

Auto parts Ltd., has an annual production of 90,000 units for a motor component. The component cost structure is as below:

	Rs. Per unit
Material	270
Labour (25% fixed)	180
Expenses	
Variable	90
Fixed	135
Total	675

- (a) The purchase manager has an offer from a supplier who is willing to supply the component at Rs. 540. Should the component be purchased as production stopped?
- (b) Assume the resources now used for this component's manufacture are to be used to produce another new product for which the selling price is Rs. 485.
In the latter case the material price will be Rs. 200 per unit. 90,000 units of this product can be produced at the same cost basis as above for labour and expenses. Discuss whether it would be advisable to divert the resources to manufacture that new product, on the footing that the component presently being produced, be purchased from the market.

Answer: net saving: Rs. 13,50,000

Question: 2

B Ltd. Produces and sell Bicycles. It also manufactures the chains for its Bicycles. It expects to produce and sell 24,000 Bicycle during 1996-97. It is considering an offer from an outside vendor to supply and number of chains at Rs. 12 per chain. The accountant of B Ltd. Reports the following costs for producing 24,000 chains.

Cost	Cost per unit Rs.	Total cost Rs.
Direct material	5.00	1,20,000
Direct labour	4.00	96,000
Variable manufacturing overhead	2.00	48,000
Inspection set up etc.	1.00	24,000
Machine rent	1.00	24,000
Allocated fixed overhead	1.25	30,000
	14.25	3,42,000

Inspection, set up etc. varies with the number of batches in which the chains are produced. Currently chains are being produced in the batch size of 2,000 units.

Direct labour cost represents wages to four workers who are exclusively engaged in the manufacturing of chains. These workers are in permanent capacity and cannot be retrenched.

If B Ltd. Procures all its chains from outside vendor, it will not require the machine which it has hired for manufacturing chains:

Required:

- (i) Assume that if B Ltd. Purchases chains from outside vendor, the facility (including workers) where the chains are currently manufactured will remain idle. Should B Ltd. Accept the offer from outside vendor at the anticipated production and sale volume of 24,000 units.
- (ii) Whether your decision in (i) will change if facilities can be used to upgrade the Bicycle, which will result in incremental revenue of Rs. 22 per Bicycle. The variable cost for upgrading would be Rs. 18 per and tooling cost would be Rs. 16,000
- (iii) Assume that facilities will be as stated in (ii) above. Further assume that with better planning B Ltd. Will be able to manufacture chains in the batch size of 4,000 units (instead of 2,000 units) if it decides to produce chain inside.

Answer: (Excess of bought out price over variable cost and avoidable cost = 72,000 RS.)

Question: 3

New vistas Ltd. Is in the midst of make or buy decision. One of the components P44E produced by the company and incorporated into another product before being sold, takes 4 hours for manufacture and its budgeted manufacturing cost is as under:

	Rs. Per unit
Direct material	14
Direct labour	12
Variable overheads	8
Fixed overheads	20
Total	54

- (i) One of its reliable suppliers has offer to supply P44E at a guaranteed price of Rs. 50 per unit. Should the company accept the offer?
- (ii) Mean while a new situation has arisen. As per a recent Government regulation if P44E is continued to be manufactured, the company will incur additional inspection and testing charges of Rs. 56,000 per annum and this has not been included in the existing budgeted manufacturing cost of the component. In this situation what should the company do?
- (iii) As there is an embargo in the company on additional recruitment of Labour, if P44E is not manufactured, the direct labour released will be employed in increasing the production of an existing product, which takes 8 hours to make and is sold for Rs. 90. Its budgeted manufacturing cost is as under:

Direct material	10
Direct labour	24

Variable overhead	16
Fixed overheads	40
Total	90

What is your advice?

Question: 4

You are the management Auditor of XYZ Co. Ltd. The managing director of the company seeks your advice on the following problem:

The XYZ Ltd. Produces a variety of products each having a number of component parts. Product “B” takes 5 hours to produce on a machine no. 99 working at full capacity. “B” has a selling price of Rs. 50 and a marginal cost of Rs. 30 per unit. “A-10” a component part could be made on the same machine in 2 hours for a marginal cost of Rs. 5 per unit. The supplier’s price is Rs. 12.50 per unit. Should the company make or buy “A-10”? Assume that machine hour is the limiting factor.

Answer: Company to buy the product from outside.

A firm needs a component in an assembly operation. If it wants to do the manufacturing itself, it would need to buy a machine for Rs. 4 lakhs, which will last for 4 years with no salvage value. Manufacturing costs in each of the 4 years would be Rs. 6 lakhs, Rs. 7 lakhs, Rs. 8 lakhs and Rs. 10 lakhs respectively. If the firm had to buy the components from a supplier, the cost would be Rs. 9 lakhs, Rs. 10 lakhs, Rs. 11 lakhs and Rs. 14 lakhs respectively in each of the four years. However, the machine would occupy floor space, which would have been used for another machine. This latter machine would be hired at no cost to manufacture an item the sale of which would produce net cash flows in each of the four years of Rs. 2 lakhs. It is impossible to find room for both the machines and there are no other external effects. The cost of capital is 10% and the present value factor for each of the four year is 0.909, 0.826, 0.751, and 0.683 respectively.

Should the firm make the components or buy from outside?

Answer: Rs. 0.148 (lakhs)

Question: 5

A machine manufactures 10,000 units of a part at a total cost of Rs. 21 of which Rs. 18 is variable. This part is readily available in the market at Rs. 19 per unit. If the part is purchased from the market then the machine can either be utilized to manufacture a component is same Quantity contributing Rs. 2 per component or it can be hired out at Rs. 21,000. Recommend which of the alternative as profitable?

Answer: IIIrd alternative is the best

Question: 6

A company is considering the possibility of purchasing from a supplier components is now makes. The supplier will provide the components in the necessary quantities at a unit price of Rs. 9. Transportation and storage costs would be negligible.

The company produces the components from a single raw material in economic lots of 2,000 units at a cost of Rs. 2 per unit. Average annual demand is 20,000 units. The annual holding cost is Rs. 0.25 per unit and the minimum stock level is set at 400 units. Direct labour costs for the components are Rs. 6 per unit, fixed manufacturing overheads is charged at a Rate of Rs. 3 per unit based on a normal activity of 20,000 units. The company also hires the machine on which the components are produced at a rate of Rs. 200 per month. Should the company make the components?

Question: 7

ABC Ltd. A LPG cylinder manufacturing unit gets an order from the Oil Corporation for supply of 40,000 cylinders at the standard price of Rs. 700 per cylinder. Getting orders is a major problem. If an order is not executed in full for any reason not only will ABC Ltd. Lose the benefit, but it stands the risk of the order quantity being reduced for the next quarter also. The cylinders are made in two halves and then welded together.

The cost structure is:

Material	12.5 Kg per half
Labour	Rs. 50 per half

Welding charges and fitting charges would be Rs. 30 per cylinder. Unfortunately special steel plates are in short supply and ABC Ltd. Has only stock of 500 MT. Another friendly unit which has, in anticipation, made bottom halves. Has offered to supply 40,000 numbers. What is the maximum price ABC Ltd. Can pay to the unit for the bottom halves? Transportation and unloading, etc. will cost of Rs. 5 per each half.

Answer: Rs. 132 lakhs/40,000= Rs. 330 per bottom Half

Question: 8

A company engaged in the manufacture of consumer product has developed a special adhesive gum called "Adgum" to utilize its spare production capacity. Adgum is to be sold in tubes of 50ml. capacity to distributors packed in box of 40 tubes at Rs. 240 per Box. The company estimates a sales of 2,00,000 tubes per month at the cost estimates based on this volume of production are as under:

	Per Box Rs.
Direct material	100
Direct wages	60
Variable overheads	60
Allocation fixed overhead	12
Total	232

The company expect that in course of time the sales can be increased to 3,00,000 tubes per month and ultimately to 7,00,000 per month. The sales of Adgum requires a special tube manufacturing capacity. The company has a machine is capable of producing 2,00,000 empty tubes of the requisite size per month and this machine is at present idle. It can be used for producing the empty tubes required packing Adgum.

Alternatively, the company can purchase empty tubes from the market at a cost of Rs. 90 per 100 tubes. In that event, there will be a saving of 20% in material costs and 10% in labour and overhead costs of Tube estimated above.

If the company, however, desired to manufacture the empty tubes in excess of 2,00,000 tubes, a new tube making machine involving a fixed overhead of Rs. 40,000 per month will have to be installed. The capacity of the new machine is 5,00,000 empty tubes per month.

Required:

1. Prepare statement to show whether the company should make or buy empty tubes at each of the levels of production of Adgum of 2,00,000 , 3,00,000 and 5,00,000, 7,00,000 tubes.
2. At what volume of sales of Adgum will the company find in justifiable to install the new empty tube manufacturing machine.
3. Prepare a statement to show the overall profit at the four volume of production and sales of Adgum. Viz., 2,00,000, 3,00,000 and 5,00,000, 7,00,000 tubes based on your decisions to make or buy empty tubes.

Answer: decision: make the empty tubes for which the capacity exists.

Saving in buy : Rs. 0.10

Profit : Rs. 40,000, 80,000, 1,60,000

Fixed cost : Rs. 60,000

Question: 9

SV Ltd has budgeted the manufacture of 30,000 units of its only product “A” for the newt quarter. The capacity of the factory has not been fully utilized.

The variable cost per unit of Product “A” is as under:

Direct material	48.00
Direct wages (Rs. 4 per hour)	36.80
Factory variable overheads	27.60
Selling overheads variable	18.00

Production “A” sold at Rs. Rs. 200 per unit. Fixed overheads for the quarter Rs. 15,00,000. At present the company manufacturing component ‘P’, one unit of which is used in each unit of product A. the cost of this component is already in the cost structure of Product ‘A’ as aforesaid. Any how the cost per batch of 1,000 units of the component ‘P’ is separately supplied as under.

Direct material	6,000
Direct wages	4,800

Factory variable overheads	3,600
Fixed overheads apportioned to the component	3,600
Total costs	18,000

It is proposed to utilize the spare capacity by manufacture of 1,500 units of Product 'B' for export. The details are as under:

Export selling price	Rs. 228 per unit
Direct material cost	80 per unit
Direct labour	16 hours per unit
Variable selling expenses applicable to this product is	Rs. 20 per unit

Factory variable overheads to charged, calculated on the basis of direct Labour Hour rate applicable to Product A.

It has to be noted that component P is not used in the manufacture of Product B.

You are required to :

1. Present a statement showing the profit as originally envisaged in the budget.
2. State whether component P should be manufacture or bought from the market if this can be procured at a price of Rs. 16 per unit.
3. Calculate the contribution on account of accepting the export order of producing 'B'

Answer: Profit = 5,88,000, saving, if component is made 1.60. Total contribution = 24,000 [(228-212) x 1500]

Question: 10

Part No. 4466 manufactured by Modern Engineers Ltd and is used extensively in the company's finished products. The annual requirement for this component is 12,000 units. The lowest price quotation so far required from an outside supplier is Rs. 21.50 per unit. This is being considered as the company wants to discontinue manufacture of this component and buy it from outside. You are asked to help the company for taking a decision. In this connection, the following figures are supplied to you:

The expenses when part No. 4466 was in production for 12,000 units were as under:

	Rs.
Material	3,50,000
Direct labour	4,00,000
Indirect labour	1,60,000
Lighting	20,000
Power	30,000
Depreciation	2,00,000
Insurance	15,000
Miscellaneous	27,000

Fringe benefit to labour work out normally 15% of total labour costs. Discontinuing the production of this component would not in any way permit the disposal of the factory's assets. The following proportion of expenses can be avoided. If manufacture of Part No. 4466 is stopped:

	Percentage
Materials	30
Direct labour	35
Indirect labour	25
Power	20

When the part is purchased from an outside supplier, shipping charge would average 75 paise per unit and indirect labour cost would be increased by Rs. 20,000 annually for receiving, inspection and handling the purchased parts.

Prepare a schedule showing the relating costs of buying and making Part No. 4465 and give your recommendation. What would be the Non-Financial Aspects that would be relevant to the decisions?

Answer: Increment Profit on decision to buy (Rs. 3,18,000-Rs. 2,90,000) = 28,000

Remarks: it is obvious from the analysis given above that company should buy from outside. It will result in a saving of Rs. 28,000

Question: 11

A company manufacturing agricultural machinery is preparing its budget for the year 1995. An initial review shown that it will not be possible to manufacture all requirements for components A, B, C and D because the normal metal pressing capacity of 20,000 hours would be exceeded. The company can choose between the alternative courses of action given below to obtain the products in excess of normal production capacity:

- (i) To pay entirely from outside suppliers;
- (ii) To buy from outside suppliers and/or use a partial second shift.

The data given below are for the year 1995:

Standard production cost per unit:

Components	A	B	C	D
	Rs.	Rs.	Rs.	Rs.
Variable costs:				
Direct material	18.50	13.50	12.50	22.00
Direct wages	5.00	4.00	11.00	20.00
Direct expenses	5.00	10.00	5.000	30.00
Fixed overheads	2.50	2.00	5.50	10.00
Total production cost	31.00	29.50	34.00	82.00
Requirements, in units	2,000	3,500	1,500	2,800

Direct expenses relate to the use of the metal presses, which cost Rs. 5 per machine hour to operate. Fixed overheads is absorbed as a percentage of direct wages.

Quotations obtained from outside suppliers indicate a willingness to manufacture all or any part of the total requirements at the following prices; each delivered to the factory:

Component	Rs.
A	30.00
B	29.50
C	26.00
D	84.00

Second shift operations would increase direct wages costs by 25% over the normal shift, and fixed overhead by Rs. 250 for each 1,000 (or part thereof) second shift hours worked. You are required. Using the information given above and showing your supporting calculations to state.

- Which components, and in what quantities, should be manufactured in the 20,000 hours of press time available:
- Whether it would be profitable to make any of the balance of components required on a second shift basis instead of buying them from outside suppliers.

Answer: (a) savings per press hour (d/a)	1.50	1.00	2.50	2.00
(b) order of priority for press capacity	11	111	-	1

Question: 12

Priya Gadgets Ltd. Specializing in household gadgets, has just perfected and test marketed a modified version of a popular gadget. It has three components X, Y and Z one of each is require per gadget. All these components are made and assembled in its own factory and capacity utilization of machines is full.

The modification essentially involves a special machining and fixing a new attachment for which the company has provided for double the existing production capacity to take care of possible increased demand.

The cost structure of the modified gadget is as under:

Components	Machine hours per unit	Variable cost per unit	Fixed cost allocated per unit Rs.	Total cost
X	16	50	15	65
Y	24	56	20	76
Z	32	54	360	84
Special machinery & assembly	-	60	45	105
Selling price		220	110	330
				500

Since the response to the modified gadget is very good the company would like to capture the market in the ensuring year itself by increasing sales. While all the existing machines in the factory

are capable of making all the components X, Y and Z, increase of machine capacity cannot be achieved/made during the budget year. However the special machining process and capacity permits one of the components either X, Y or Z to be bought from outside. The following offers have been received:

Components	Price per unit Rs.
X	66
Y	78
Z	94

The marketing manager feels that sales can be increased at least by 50% during the year and with a little advertisement support even 75%.

You are required to give your recommendations as to which components should be bought from outside if production is to be increased by 50% and 75% respectively.

Answer: in case of 50% increase X and Y are to be bought. In case of 75% increase Z is to be bought.

Question: 13

Fortune Ltd. Manufactures product N using one unit each of three components named P, A, & R and sells it at Rs. 37.50 per unit. It has two divisions. In production division it produces all the types of components by using its full capacity of 42,000 machine hours. In assembly division the remaining job is performed by the workers manually before N is ready for sale. Product N is manufactured in batches of 100 units and the data relating to the current production per batch are:

	Machine hours	Variable costs Rs.	Fixed costs Rs.	Total costs
Prod. Division:				
Component-P	15	375	150	525
Component-Q	25	450	175	625
Component-R	30	450	450	900
Assembly division:				
Assembly		800	325	1,125

For the next year the company has estimated that its sale would go up by 50% more than the present sales and probably even by 75% if the production capacity is made available. The machine capacity cannot be increased during the next year even through the workers in the assembly division can be increased as per requirement without any increased as per requirement without any increase in fixed costs. To meet the increase demand production can be taken up and processed in assembly divisions by procuring the components from the open market. The company has received the following price quotations for the purchase of components:

	P	Q	R
Price offered per components (Rs.)	5.55	7.00	8.40

You are required to:

- Determine the production and profits being earned at present.

- (ii) Indicate which of the components should be purchased and in what quantities at the two estimated levels of output viz. increase by 50% and 75% of existing production.
- (iii) Prepare a statement showing the company's profitability both the estimated levels of output.
- (iv) If only one component is to be purchased than which is o purchased in what quantity increase of demand by 50% & 75%.
- (v) If only one components is to be purchased than which is to purchase in what quantity increase to demand by 50% & 75%. Total machine hours 42,000 are not provided.

Answer:

Profit = 3,45,000

Profit = 6,37,500

If only one component is to be purchased than which is to be purchased in what qty in increase of demand by 50% & 75%

Repeat.

Ignoring 42000 working hour.

Question: 14

AB Ltd. Manufactures a picnic table which has three component X, Y and Z one of each being required for each table. The company is working to its full machine capacity of 28,000 hours per period and the machinery used is capable of making all the components.

The tables are made in batches of 20 and data relating to current production are: per batch of 20.

	Machine Hours	Variable costs Rs.	Fixed costs Rs.	Total costs
Components				
X	6	15	6	21
Y	10	18	7	25
Z	12	18	18	36
	28			
Assembly		32	13	45
				127
Profit				23
Selling price				150

Over the next budget period the machine capacity cannot be increased although the assembly capacity can be increased as required. The budget for the next period is being prepared. Because sales are buoyant the purchase of one of the components is being considered and the following quotations has been received:

Batch of 20 component	Price Rs.
X	22
Y	28
Z	32

The company has decided that only one component will be bought from outside in one period. The sales director think that he could sells at least 50% more tables than at present and probably 75% more provided that the production capacity was available.

You are required to:

- Recommend which component should be bought outside if production is increased by 50% and how many components should be bought:
- Recommend which component should be bought outside if production increased by 75% and how many components should be bought:

Answer: balance hours required to make Y (100* 10hrs) = 1,000 available hours 28,000

(a) 1400 components of Y should be purchased

(b) purchase 1750 of Z. Saving per hour (1.17,1.00,1.17)

Question- 15

A company manufacturing a highly successful line of cosmetics intends to diversify the product line to achieve fuller utilization of its plant capacity. As a result of considerable research made, the company has been able to develop a new product celled "EMO".

EMO is packed in tubes of 50 gram capacity and is sold to the wholesalers in cartons of 24 tubes at Rs. 240 per carton. Since the company uses its spare capacity for the manufacture of EMO, no additional fixed expenses will be incurred. However the cost accountant has allocated a share of RS. 4,50,000 per month as fixed expenses to be absorbed by EMO as a fair share of the company's present fixed costs to the new product for costing purposes.

The company estimates the production and sale of EMO at 3,00,000 tubes per month and on this basis the following cost estimates have been developed:-

	Re. per carton
Direct materials	108
Direct Wages	72
All overheads	54
Total costs	234

After a detailed market survey the company is confident that the production and sales of EMO can be increased to 3,50,000 tubes per month and ultimately to 4,50,000 tubes per month.

The company at presently has capacity for the manufacture of 3,00,000 empty tubes and the cost of the empty tubes if purchased from outside will result in a saving of 20% in material and 10% in direct wages and variable overhead costs of EMO. The price at which the outside firm is willing to supply the empty tubes is Rs. 1.35 per empty tube. If the company desires to manufacture empty tubes in excess of 3,00,000 tubes, a new machine involving an additional fixed overhead of Rs. 30,000 per month will have to be installed.

Required:-

- (i) State by showing your workings whether the company should make or buy the empty tubes at each of the three volumes of production of EMO namely, 3,00,000, 3,50,000 and 4,50,000 tubes.
- (ii) At what volume of sales will it be economical for the company to install the additional equipment for the manufacture of empty tubes?
- (iii) Evaluate the profitability on the sale of EMO at each of the aforesaid three levels of output based on your decision and showing the cost of empty tubes as a separate element of cost.

Question- 16

A firm needs a component in an assembly operation. If it wants to do the manufacturing itself, it would need to buy a machine for Rs. 4 lakhs which would last for 4 year with on salvage value. Manufacturing costs in each of the 4 years would be Rs. 6 lakhs, Rs. 7 lakhs, Rs. 8 lakhs and 10 lakhs respectively. If the firm had to buy the component from a supplier the component would cost Rs./ 9 lakhs, Rs. 10 lakhs, Rs. 11 lakhs and Rs., 14 lakhs respectively in each of the 4 years. However the machine would occupy floor space which could have been used for another machine. This latter machine could be hired at no cost to manufacture an item, the sale of which would produce net cash flows in each of the 4 years of Rs. 2 lakhs; it is impossible to find room for both the machines and there are no other external effects. The cost of capital is 10% and PV factor for each of the 4 years is 0.909, 0.826, 0.751, and 0.683 respectively. Should the firm make the component or buy from outside?

Answer: saving in buying Rs. 0.148 lakh.

Question- 17

Fortune Ltd. manufactures product N using one unit each of three components named P, Q & R and sells it at Rs. 37.50 per unit. It has two divisions. In production division it produces all the types of components by using its full capacity of 42,000 machine hours. In assembly division the remaining job is performed by the workers manually before N is ready for sales:

Product N is manufactured in batches of 100 units and the data relating to the current production per batch are:

	Machine	Variable	Fixed	Total
	Hours	Costs	Costs	Costs
		RS.	Rs.	Rs.
Production Division				
Component – P	15	375	150	525
Component - Q	25	450	175	625
Component- R	30	450	450	900
Assembly Division				
Assembly	---	800	325	1,125
		2,075	1,100	3,175

For the next year the company has estimated that its sales would go up by 50% more than the present sales and probably even by 75% if the production capacity is made available.

The machine capacity cannot be increased during the next year even though the workers in the assembly division can be increased as per requirement without any increase in fixed costs. To meet the increased demand, production can be taken up and processed in assembly division by procuring the components from the open market. The company has received the following price quotations for the purchase of components:

	P	Q	R
Price offered per component (Rs.)	5.55	7.00	8.40

You are required to:

- (i) Determine the production and profits being earned at present.
- (ii) Indicate which of the component(s) should be purchased and in what quantities at the two estimated levels of output viz. increase by 50% and 75% of existing production.
- (iii) Prepare a statement showing the company's profitability at both the estimated levels of output.

Answer: (i) Production 60,000 units, Profit Rs. 3,45,000; (ii) 84,000 and 1,05,000 units of Q respectively should be purchased from the market; (iii) Profit Rs. 6,37,500 & Rs. 7,73,250

Question- 18

A firm needs a component in an assembly operation. If it wants to do the manufacturing itself, it would need to buy a machine for Rs. 4 lakhs which will last for 4 years with no salvage value. Manufacturing costs in each of the 4 years would be Rs. 6 lakhs, Rs. 7 lakhs, Rs. 8 lakhs and Rs. 10 lakhs respectively. If the firm had to buy the components from a supplier, the cost would be Rs. 9 lakhs, Rs. 10 lakhs, Rs. 11 lakhs and Rs. 14 lakhs respectively in each of the four years. However, the machine would occupy floor space which would have been used for another machine. This latter machine would be hired at no cost to manufacture an item, the sale of which would produce net cash flow in each of the four years of Rs. 2 lakhs. It is impossible to find room for both the machines and there are no other external effects. The cost of capital is 10% and the present value factors for each of the four years is 0.909, 0.826, 0.751, and 0.683 respectively. Should the firm make the components or buy from outside?

Answer: there is a saving of Rs. 14,800 in buying the component from outside.

Question- 19

A machine manufactures 10,000 units of a part at a total cost of Rs. 21 of which Rs. 18 is variable. This part is readily available in the market at Rs. 19 per unit. If the part is purchased from the market then the machine can either be utilized to manufacture a component in same quantity contributing Rs. 2 per component or it can be hired out at Rs. 21,000. Recommend which of the alternative is profitable?

Answer: third alternative is the best, as the cost of 10,000 required units under it is the

lowest Rs. 1,69,000; Fixed cost is not relevant for decision making.

Question- 20

GG Ltd. manufacture and sells an equipment called water purifier. The cost data for each batch of ten numbers of water purifier is as follows:

Component	A	B	C	D	E
Machine hours	20	28	24	-	-
Labour hours	-	-	-	4	2
	Rs.	Rs.	Rs.	Rs.	Rs.
Variable costs	64	108	116	24	8
Fixed costs as apportioned	36	52	64	26	22

Assembly costs (all variable) Rs. 50 per batch.

Selling price Rs. 800 per batch.

Maximum available machine capacity for making components A, B and C is 10,800 hours and it cannot be increased further. Labour is available for making component D and E and for assembling the product.

Estimated increase in demand next year is 50% and fixed costs in general may increase by Rs. 10,000.

In order to release production capacity to meet increased market demand, the company decided to purchase one of the machine made components.

Quote Ltd. is the only supplier of components A, B and C. Because of incomplete records, it is unable to quote single figure prices. Its quotation is as follows:

Component	Pessi- Mistic view	Proba- Bility	Most likely View	Proba- Bility	Optimistic View	Proba- Bility
	Rs.		Rs.		Rs.	
A	120	0.25	110	0.5	80	0.25
B	200	0.25	130	0.5	140	0.25
C	160	0.25	140	0.5	120	0.25

It is agreed between the companies that the price of each of the components will be determined on an overall basis based on information found in the quotation.

You are required to:

- Indicate, in the context of key factor, the maximum number of batches that could be produced, if each of the three alternatives namely buying A or B or C is considered.
- Analyse the financial implication of purchase and advise which component is to be bought keeping in view the fact that production capacity will be limited to a 50% increase.
- Prepare a profit statement for the period assuming that the component chosen by you is bought out and extra production is made and sold.

Answer:

Purchased from outside

(i)	No. of batches produced internally (in batches)	207.69	245.45	225
(ii)	Component C should be purchased from outside as it gives maximum contribution of Rs. 91,350			
(iii)	Profit on manufacturing of 225 batches Rs. 51,350.			

Question- 22

Gemini Enterprises currently makes as many units of part no. X-248 as it needs. Sen, General Manager of Gemini Enterprises, has received a quotation from another company for making part no. X-248. Zedco will supply 1,000 units of part no. X-248 per year at Rs. 50 per unit. Zedco can begin supply on 1st July, 1998 and continue for 5 years, after which Gemini will not need the part, Zedco can accommodate any change in Gemini's demand for the part and will supply it for Rs. 50 regardless of quantity.

Shah, the controller of Gemini Enterprises, reports the following costs for manufacturing 1,000 units of part no. X-248:

	Rs.
Direct materials	22,000
Direct labour	11,000
Variable manufacturing overhead	7,000
Depreciation on machine	10,000
Product and process engineering	4,000
Rent	2,000
Allocation of general plant overhead costs	5,000
Total costs	61,000

The following additional information is available:

- Part X-248 is made on a machine used exclusively for its manufacture. The machine was acquired on 1st July, 1997, at a cost of Rs. 60,000. The machine has a useful life of six years and a zero terminal disposal price. Depreciation is calculated on straight-line basis.
- The machine could be sold today for Rs. 15,000
- Product and process engineering costs are incurred to ensure that the manufacturing process for part No. X-248 work smoothly. Although these costs are fixed in the short run, with respect to units of part no. X-248, they can be saved in the long run if part no. X-248 is no longer produced. If part no. X-248 is out sourced, product and process engineering costs of Rs. 4,000 will be incurred for 1997-98 but not thereafter.
- Rent costs of Rs. 2,000 are allocated to products on the basis of the floor space used for manufacturing the product. If part number X-248 is discontinued, the space currently used to manufacture it would become available. The company could then use the space for storage purposes and saves Rs. 1,000 currently paid for outside storage.
- General plant overhead costs are allocated to each department on the basis of direct manufacturing labour costs. The costs will not change in total. Buy no general plant overhead will be allocated to part number X-248 if the part is outsourced.

Assume that Gemini requires a 12% rate of return for this project. The following information may be useful:

Year	Present Value Factor at 12%
0	1.000
1	0.893
2	0.797
3	0.712
4	0.636
5	0.567

Required:-

- Should part number X-248 be outsourced? Prepare a quantitative analysis.
- State any sensitivity analysis that seems to be advisable. Do not perform any sensitivity calculations.
- Sen is particularly concerned about his bonus for 1997-98. The bonus is based on the accounting income of Gemini Enterprises. What decision will Sen make if he wants to maximize his bonus for 1997-98?

Answer: (i) Make internally; (iii) No change in Bonus.

Question- 23

- What are the specific cost and non-cost factors to be considered in the make or buy decision?
- Expansion Ltd. manufactures automobile accessories and parts. The following are the total costs of processing 1,00,000 units:

Direct material costs	Rs. 5 lakhs
Direct labour costs	Rs. 8 lakhs
Variable factory overhead	Rs. 6 lakhs
Fixed factory overhead	Rs. 5 lakhs

The purchase price of the component is Rs. 22. The fixed overhead would continue to be incurred even when the component is bought from outside, although there would have been reduction to the extent of Rs. 2,00,000.

Required:

- Should the part be made or bought considering that the present facility when released following a buying decision would remain idle?
- In case the released capacity can be rented out to another manufacturer for Rs. 1,50,000 having good demand, what should be the decision?

Question- 24

Auto parts Ltd., has an annual production of 90,000 units for a motor component. The component cost structure is as below:

Material	Rs. 270 per unit
----------	------------------

Labour (25% fixed)	Rs. 180 per unit
Expenses:	
Variable	Rs. 90 per unit
Fixed	Rs. 135 per unit
Total	Rs. 675 per unit

- (a) The purchase manager has an offer from a supplier who is willing to supply the component at Rs. 540. Should the component be purchased and production stopped?
- (b) Assume the resources now used for this component's manufacture are to be used to produce another new product for which the selling price is Rs. 485.

In the latter case the material price will be Rs. 200 per unit. 90,000 units of this product can be produced at the same cost basis as above for labour and expenses. Discuss whether it would be advisable to divert the resources to manufacture that new product, on the footing that the component presently being produced would instead of produced would instead of being produced, be purchased from the market.

Question- 25

ABC Ltd produces a variety of products each having a number of component parts. Product B takes 5 hours to produce on a particular machine which is working at full capacity. B has a selling price of Rs. 100 and variable cost of Rs. 60 per unit. A component part X-100 could be made on the same machine in two hour at a variable cost of Rs. 10 per unit. The suppliers price for the component is Rs. 25 per unit.

Required:

Advice whether the company should buy the component X-100 (if necessary make suitable assumptions)

A company is engaged in the manufacture of an electronic gadget. It produces 24,000 such gadgets per annum. The company also manufactures 24,000 units of a component.

The department expenses per annum is as under:

Direct material	Rs. 38,40,000
Direct labour	15,36,000
Indirect labour	7,20,000
Inspection and testing	4,80,000
Lighting	40,000
Power	4,80,000
Insurance	30,000
Depreciation	96,000
Miscellaneous fixed expenses.	54,000

If the company stops manufacturing the components and buys the same from market, the saving in departmental budget will be as under

Direct materials	20%
Direct labour	25%

Indirect labour	20%
Inspection and testing	25%
Power	25%
The purchase price of the component is Rs. 70 each	

Required:

- (i) State whether the company should make or buy the components.
- (ii) The company offer is accepted by the company, the capacity will be fully utilized and the components have to be purchased. Should the company then make or buy the component?

Question- 26

A company manufacturing chemicals furnishes the following data of their activities for the year 1993-94. The company manufactures three product namely Ethylene, EDC and VCL. Ethylene is consumed for making EDC and EDC is consumed for making VCL. One metric ton of Ethylene is required to make one metric ton of EDC and one metric ton of EDC is required for making one metric ton of VCL. The other particulars:

	Ethylene	EDC	VCL
Production capacity per annum (Metric tons)	25,000	30,000	30,000
Cost per metric ton:			
Variable costs	Rs. 20	Rs. 30	Rs. 40
Product fixed costs	20	30	40
Common fixed costs	10	15	20
Total	50	75	100
Selling price per metric ton Rs.		150	300
Sales per annum (Metric tons)		10,000	15,000

The company restricts the manufacture of all its products only to the extent of the sales demand. The management is concerned with the low capacity utilization. In order to achieve fuller utilization of the plant capacity, the company entered into negotiations with various parties. As a result of the negotiations, X who buys one-third of the current sales volume of VCL, offers to buy 20,000 metric tons of VCL per annum at Rs. 250 per metric ton provided the entire quantity of 20,000 metric tons is sold to him. This purchase is for the captive consumption of X and therefore will not affect the market price of VCL. X also offers to supply EDC for manufacture of VCL to the extent of 5,000 metric tons at a price of Rs. 125 per metric ton. The company can also buy EDC from the open market at Rs. 140 per metric ton if the order is for 10,000 metric tons or more.

The bases of various costs given above are as follows:

- (i) Variable costs exclude the cost of internally consumed Ethylene in the manufacture of EDC and cost of EDC consumed in the manufacture of VCL.
- (ii) Fixed costs are based on normal capacity production.
- (iii) The product fixed costs can be avoided only if there is nil production of product concerned.
- (iv) Common fixed costs are to be incurred irrespective of production and sales.
- (v) No closing stocks are maintained.

You are required to:

- (a) Draw up a statement of profitability in respect of the year 1993-94 as originally envisaged by the company.
- (b) If the company decides to accept the offer of X to buy 20,000 metric tons of VCL at Rs. 250 per metric ton and if the balance quantity of production of VCL can be sold in the market show the revised statement of profitability of the company.

Question-27

A company engaged in the manufacture of consumer product has developed a special adhesive gum called "Adgum" to utilize its spare production capacity. Adgum is to be sold in tubes of 50 ml. capacity to distributors packed in cartons of 40 tubes at Rs. 240 per carton. The company estimates a sales of 2,00,000 tubes per month at the cost estimates based on this volume of production are as under:

	Per carton
Direct materials	Rs. 100
Direct wages	60
Variable overheads	60
Allocated fixed overhead	12
Total	232

The company expect that in course of time the sales can be increased to 3,00,000 tubes per month and ultimately to 5,00,000 per month.

The sales of Adgum requires a special tube manufacturing capacity. The company has a machine which is capable of producing 2,00,000 empty tubes of the requisite size per month and this machine is at present idle. It can be used for producing the empty tubes required for packing Adgum.

Alternatively, the company can purchase empty tubes from the market at a cost of Rs. 90 per 100 tubes. In that event, there will be a saving of 20% in material costs and 10% in labour and overhead costs of Adgum estimated above.

If the company, however, desired to manufacture the empty tubes in excess of 2,00,000 tubes, a new tube making machine involving a fixed overhead of Rs. 40,000 per month will have to be installed.

The capacity of the new machine is 5,00,000 empty tubes per month.

Required:

- (i) Prepare statement to show whether the company should make or buy empty tubes at each of the three levels of production of Adgum of 2,00,000, 3,00,000 and 5,00,000 tubes.
- (ii) At what volume of sales of Adgum will the company find it justifiable to install the new empty tube manufacturing machine.
- (iii) Prepare a statement to show the overall profit at the three volume of production and sales of Adgum, viz, 2,00,000, 3,00,000 and 5,00,000 tubes based on your decision to make or buy the empty tubes.

Question- 28

Agrocaps Ltd. engaged in manufacturing agricultural machinery, is preparing its annual budget for the coming year. The company has a metal pressing capacity of 20,000 hours, which will be insufficient for manufacture of all requirements of components A, B and C and D.

The company has the following choices:

- (i) Buy the components entirely from outside suppliers.
- (ii) Buy from outside suppliers and/or use a partial second shift.

The data for the current year are given below:

Standard production cost per unit				
Component	A	b	C	D
Requirements in units	2,000	3,500	1,500	2,800
Variable cost:				
Direct materials	Rs. 37	Rs. 27	Rs. 25	Rs. 44
Direct wages	10	8	22	40
Direct expenses	10	20	10	60
Fixed overhead	5	4	11	20
Total production cost	62	59	68	164

Direct expenses relate to the use of the metal presses which cost Rs. 10 per hour to operate. Fixed overheads are absorbed as a percentage of direct wages.

Supply of all or any part of the total requirement can be obtained at the following prices, each delivered to the factory:

Component	Rs.	Components	Rs.
A	60	C	52
B	59	D	168

Second shift operations would increase direct wages by 25 percent over the normal shift and fixed overhead by Rs. 500 for each 1,000 (or part thereof) second shift hours worked.

You are required to present, with calculations:

- (a) Which components, and in what quantities should be manufactured in the 20,000 hours of press time available?
- (b) Whether it would be profitable to make any of the balance of components required on a second shift basis instead of buying them from outside suppliers.

Question- 29

What factors have to be taken into account in a make or buy decisions?

SV Ltd., has budgeted the manufacture of 30,000 units of its only product 'A' of the next quarter. The capacity of the factory has not been fully utilized.

The variable cost per unit of Product 'A' is as under:

Direct materials Rs. 48.00

Direct wages (Rs. 4 per hour) Rs. 36.80

Factory variable overheads Rs. 27.60

Selling overheads – variable Rs. 18.00

Production 'A' sold at Rs. 200 per unit. Fixed overhead for the quarter Rs. 15,00,000.

At present the company manufactures component 'P', one unit of which is used in each unit of product A. the cost of this component is already included in the cost structure of Product 'A' as aforesaid. Anyhow the cost per batch of 1,000 units of the component 'P' is separately supplied as under:

Direct materials	Rs. 6,000
Direct wages	4,800
Factory variable overhead	3,600
Total costs	3,600
Total costs	18,000

It is proposed to utilize the spare capacity by manufacture of 1,500 units of Product 'B' for export the details are as under:

Export selling price	Rs. 228 per unit
Direct material cost	80 per unit
Direct labour	16 hours per unit
Variable selling expenses applicable to this product is	Rs. 20 per unit.

Factory variable overheads have to be charged, calculated on the basis of Direct Labour Hour rate applicable to product A.

It has to be noted that component P is not used in the manufacture of Product B.

You are required to:

- (i) Present a statement showing the profit as originally envisaged in the Budget.
- (ii) State whether component P should be manufactured or bought from the market if this can be procured at a price of Rs. 16 per unit.
- (iii) Calculate the contribution on account of accepting the export order of producing 'B'

Chapter – 6

Marginal Costing V/s Absorbtion Costing

Basics of Marginal Costing

Question :1

May 2008

A Ltd. makes and sells a single product. The company's trading results for the year 2007 are:

Figs. – Rs.. '000 (Year 2007)

Sales		3,000
Direct materials	900	
Direct labour	600	
Over heads	<u>900</u>	<u>2,400</u>
Profits		<u>600</u>

For the year 2008, the following are expected:

- (i) Reduction in the selling price by 10%.
- (ii) Increase in the quantity sold by 50%.
- (iii) Inflation of direct material cost by 8%.
- (iv) Price inflation in variable overhead by 6%.
- (v) Reduction of fixed overhead expenses by 25%.

It is also known that:

- (a) In 2006, overhead expenditure totalled to Rs. 8,00,000
- (b) Total overhead cost inflation for 2007 has been 5% more than 2006.
- (c) Production and sales volumes have been 25% higher in 2007 than in 2006.

The high-low method is being used by the company to estimate overhead expenditure.

You are required to:

- (i) Prepare a statement showing the estimated trading results for 2008.
- (ii) Calculate the Break-even point for 2007 and 2008.
- (iii) Comment on the BEP and profits of the years 2007 and 2008.

Question :2

Nov. 1988

The cost profile of a company, manufacturing only one product, is as under:-

	Rs.
Direct material	5.60
Direct labour	1.50
Variable factory overhead	<u>0.40</u>
	<u>7.50</u>

Fixed factory overhead is budgeted at Rs. 3,30,000 for and annual sales on 4,00,000 units.

Selling, Distribution and Administration costs are budgeted at Rs. 1,80,000.

Capital employed is Rs. 4,50,000 in fixed assets and 50% of sales in current assets.

Determine as selling price of the product to yield a 20% return on capital employed.

Answer: Rs. 10

Question :3

May 1990

Magic Carpets Associates have just developed a new carpet design with the brand name Arabian Nights. Sales demand is very difficult to predict but it very much depends upon the selling price. At a price of Rs. 30 per square metre it is estimated that the annual sales demand would be between 50,000 and 90,000 sq. metres per annum. At a price of Rs. 40 per sq. metre, sales demand would be between 34,000 and 44,000 sq. metres per annum. As regards cost, at production volumes

of 45,000 sq. metres or less per annum, attributable fixed cost would be Rs. 2,12,000 per annum and variable cost would be Rs. 32 per sq. metre. At higher production volumes, attributable fixed costs would increase to Rs. 3,08,000 but variable costs per sq. metre would be only Rs. 24.

Arabian Nights has been developed at a cost of Rs. 80,000.

When the product is marketed, an amount of Rs. 70,000 per annum will be charged to the operation towards Head Office Expenses.

The production of the new carpet will have to be supervised by a foreman. In order to find time for supervision he has to give up work in another department, for which he is paid a salary of Rs. 1,000 per month.

The production of Arabian Nights would be undertaken of course, in a division of the factory which is at present rented out to M/s Shine or Rain Ltd., Umbrella – makers for an amount of Rs. 10,000 per quarter.

You are required to calculate the margin of safety, as a percentage of expected sales volume at both the maximum and minimum sales volume for the two price levels and decide on the selling price per sq. metre.

Answer: Margin of safety 33.33%, 25% respectively.

Question : 4

Nov. 1991

Titan Engineering is operating at 70 per cent capacity and present the following information:-

Break-even point	Rs. 200 crores
P/V Ratio	40 per cent
Margin of safety	Rs. 50 crores

Titan's management has decided to increase production to 95 percent capacity level with the following modifications:-

- (i) The selling price will be reduced by 8 per cent
- (ii) The variable cost will be reduced by 5 per cent of sales.
- (iii) The fixed cost will increase by Rs. 20 crores, including depreciation on additions, but excluding interest on additional capital.
- (iv) Additional capital of Rs. 50 crores will be needed for capital expenditure and working capital.

Required:

- (a) Indicate the sales figure, with the working, that will be needed to earn Rs. 10 crores over and above the present profit and also meet 20 percent interest on the additional capital.
- (b) What will be the revised?
 - (1) BEP
 - (2) P/V Ratio
 - (3) Margin of safety.

Answer: (a) Rs. 311.11 Crores (b) (i) Rs. 244.44 Crores; (ii) 45%; (iii) Rs. 66.67 Crores

Question :5

May 1992

Goodluck Ltd. makes a product, which has the standard marginal cost, as below:

	Rs.
Direct material	50.00
Direct wages	37.50
Variable production overhead	6.25
	<u>93.75</u>

The annual budget, further, indicates,

Output in units	80,000
Fixed overhead:	Rs.
Production	50,00,000
Administration	30,00,000
Marketing	25,00,000
Contribution	1,25,00,000

The company's management desires much better results than projected and wants the following proposals for improved performance to be considered:

- Reduce the selling price by 10 percent, with the prospect of production and sale increasing by 25 percent. The fixed production overhead will increase by Rs. 2,50,000 and fixed marketing overhead by Rs. 1,25,000.
- Increase the selling price by 10 percent, and increase advertising expenditure from the present outlay of Rs. 5,00,000 to Rs. 25,00,000. Sales will go up to 90,000 units. Fixed production overhead will be up by Rs. 1,25,000 and marketing overhead by Rs. 1,00,000.
- A profit of Rs. 30,00,000 is desired. A 10 percent increase in sales can be achieved by increasing advertisement expenditure by Rs. 18,00,000. The fixed production overhead will go up by Rs. 1,25,000 and marketing overhead by Rs. 85,000. What is the selling price required for achieving the desired profit?
- A departmental store is willing to take 20,000 units per annum at a special discount. Existing sales will not be affected. Fixed production overhead will increase by Rs. 2,50,000 per annum. What is the special discount to be offered if by accepting the contract, the company's profit is to go up to Rs. 33,75,000 per annum.

Compile the forecast profit and loss statement pertaining to the above proposals and comment on the outcome of each proposal.

Question :6

May 1995

(a) ABC Ltd. has developed a new product which is about to be launched into the market. The variable cost of selling the product is Rs. 17 per unit. The marketing department has estimated that at a sale price of Rs. 25, annual demand would be 10,000 units. However, if the sale price is set above Rs. 25. Similarly, if the price is below Rs. 25, demand would increase by 50 units for each Rs. 0.50 stepped reduction in price below Rs. 25.

Required:

Determine the price which would maximise ABC Ltd.'s profit in the next year.

- the break-even point of a manufacturing company is Rs. 1,60,000. Fixed cost is Rs. 48,000. Variable cost is Rs. 12 per unit.

Required:

Determine the contribution-margin ratio.

Answer: (a) Total Contribution would be maximum at a sale price of Rs. 26 per unit & sale demand of Rs. 9,000 units. (b) contribution margin ratio is 30%.

Question :7

Nov. 1997

X Ltd. has two factories, one at Lucknow and another at Pune producing 7,200 tonnes and 10,800 tonnes of a production against the maximum production capacity of 9,000 and 11,880 tonnes respectively at Lucknow and Pune.

10% of the raw material introduced is lost in the production process. The maximum quantity of raw material, available locally are 6,000 and 13,000 tonnes at Rs. 720 and Rs. 729 per tonne at Lucknow and Pune respectively. For the additional needs a supplier of Bhopal is ready to supply raw material at our factory site at Rs. 792 per tonne.

Other variable costs of the production process are Rs. 22.32 lacs and Rs. 32.94 lacs and fixed costs are Rs. 18 lacs and Rs. 24.84 lacs respectively for Lucknow and Pune factory.

The output is sold at a selling price of rs/ 1,450 and Rs. 1,460 per tonne by Lucknow and Pune factory respectively.

You are required to compute the cost per tonne and net profit earned in respect of each factory.

Can you suggest any other alternative production plan for both the factories without any change in present total output of 18,000 tonnes whereby the company may earn optimum profit.

Answer: Cost per tonne – Lucknow – Rs. 1,38,0; Pune Rs. 1.345; Net profit – Lucknow Rs. 5.04 Lakhs and Pune Rs. 12.42 Lakhs; Alternative production plan – Lucknow 6.120 tonnes and Pune 11,880 tonnes.

Question :8

Nov. 1997

Elegant Hotel has a capacity of 100 single rooms and 20 double rooms. It has a sports centre with a swimming pool, which is also used by persons other than residents of the hotel. The hotel has a shopping arcade at the basement and a speciality restaurant at the roof top. The following information is available:

- (i) average occupancy: 75% for 365 days of the year.
- (ii) Current costs are:

	Variable cost Rs. / per day	Fixed cost Rs. / per day
Single Room	400	200
Double Room	500	250

- (iii) Average sales per day of restaurant Rs. 1,00,000; contribution is at 30%. Fixed cost Rs. 10,00,000.
- (iv) The sports centre/swimming pool is likely to be used by 50 non-residents daily; average contribution per day per non-resident is estimated at Rs. 50; fixed cost is Rs. 5,00,000 per annum.
- (v) Average contribution per month from the shopping arcade is Rs. 50,000; fixed cost is Rs. 6,00,000 per annum.

You are required to find out:

- (a) Rent chargeable for single and double room per day, so that there is a margin of safety of 20% on hire of rooms and that the rent for a double room should be kept at 120% of a single room.
- (b) Evaluate the profitability of restaurant, sports centre and shopping arcade separately.

Answer: (a) Rent per day of single room Rs. 756; double room Rs. 907;

(b) Restaurant Rs. 99,50,000; Sports centre Rs. 4,12,500; Shopping arcade Rs. Nil

Question :9

Nov. 2004

A company has a normal manufacturing capacity of 1,50,000 units of a product per annum. The actual costs based on this output achieved during the last year were as under:

	Rs.
Direct materials	36
Direct labour	20
Variable overheads	20
Fixed overheads	20

The budget for the next year envisages the following increases:

Direct material	33.33%
Direct labour	10%
Variable overheads	5%
Fixed overheads	15%

In view of the substantial increase in material costs, the company explored the possibilities of using a substitute material. The company has been able to identify a cheaper source of direct

materials which will cost Rs. 40 per unit of output. The tests reveal that the use of cheaper direct materials as above will make the following impact on the costs:

- The direct labour cost will increase by Re. 1 per unit of output.
- It will lead to 5% rejection in output.
- It will result in a final quality testing programme evaluating an additional fixed cost of Rs. 4,00,000.

The selling prices are estimated as under for different levels of sales volume for the next year:

Selling price per units (Rs.) :	128	136	144	152	160	168	176
Demand (1,000 units) :	190	170	150	140	125	110	95

Required:

- (i) Advise whether the company should use the regular direct materials or cheaper direct materials to maximise its profitability by producing the normal volume of output.
- (ii) Considering the range of selling prices estimated at different volumes of output, determine the selling price which will maximise the profit if: (A) regular direct materials are used and (B) cheaper direct materials are used.
- (iii) Calculate for the price selected by you in (ii) above, the amount of fixed cost at which the company will be indifferent in choice of direct materials.

Answer: (i) The company should use cheaper direct material; (ii) Profit is maximum at a selling price of Rs. 160 per unit; (iii) Fixed cost of Rs. 3,50,000.

Question :10

May 2005

R Ltd. has spare capacity in two of its manufacturing departments- Department 4 and Department 5. A five day week of 40 hours is worked, but there is only enough internal work for 3 days per week so that 2 days per week (16 hours) could be available in each department. R Ltd. has sold this time to another manufacturer, but there is some concern about the profitability of this work.

The accountant has prepared a table giving the hourly operating cost in each department. The summarised figures are as follows:

	Department 4	Department 5
	Rs.	Rs.
Power costs	40	60
Labour costs	40	20
Overhead costs	<u>40</u>	<u>40</u>
	<u>120</u>	<u>120</u>

The labour is paid on a time basis and there is no charge in the weekly wage bill whether or not the plant is working at full capacity. The overhead figures are based on firm's current overhead absorption rates (fixed and variable) when the department are operating at 90% of full capacity (assume a 50 week year). The budgeted fixed overhead attributed to department 4 is Rs. 36,000 p.a. and that for the Deptt. 5 Rs. 50,400 p.a.

As a short term measure the company has been selling processing time to another manufacturer @ Rs/ 70 per hour in either department. The customer is willing to continue this arrangement and to purchase any spare time available, but R Ltd. is considering the introduction of a new product on a minor scale to absorb the spare capacity.

Each unit of the new product would require 45 minutes in Dept. 4 and 20 minutes in Deptt. 5. The variable cost of the required input materials is Rs. 10 per unit. The market study indicated as follows:

- (i) With a selling price of Rs 100, the demand would be 1,500 units p.a.
- (ii) With a selling price of Rs. 110, the demand would be 1,000 units p.a.
- (iii) With a selling price of Rs. 120, the demand would be 500 units p.a.

You are required to calculate the best weekly programme for the spare time in the two manufacturing departments, to determine the best price to charge for the new product and to quantify the weekly gain that this programme and price should yield.

Answer: Selling 100 units @ Rs. 110 per unit will achieve optimum contribution, Additional gain for introducing the new product 470.

Question :11

Nov. 2005

A Pharmaceutical company produces formulation having a shelf line of one year. The company has an opening stock of 30,000 boxes on 1st January, 2005 and expected to produce 1,30,000 boxes as was in the just ended year of 2004. Expected sale would be 1,50,000 boxes. Costing department has worked out escalation in cost by 25% on variable cost and 10% on fixed. Cost. Fixed cost for the year 2004 is Rs. 40 per unit. New price announced for 2005 is Rs. 100 per box. Variable cost on opening stock is announced for 2005 is Rs. 100 per box. Variable cost on opening stock ins Rs. 40 per box. You are required to compute Breakeven volume for the year 2005.

Answer: BEP for year 2005 = Rs. 1,08,400 boxes.

Question :12

Nov. 2006

A company following standard marginal costing system has the following interim trading statement for the quarter ending 30th June, 2005, which reveals a loss of Rs. 17,000, detailed below:

	Rs.
Sales	4,99,200
Closing stock (at prime cost)	18,000
	<u>5,17,200</u>
Costs:	
Direct material	1,68,000
Direct labour	1,05,000
Variable overhead	42,000
	<u>3,15,000</u>
Fixed overhead	1,20,000
Fixed Admn. OH	40,000
Variable distribution OH	19,200
Fixed selling OH	40,000
	<u>2,19,200</u>
Total costs	<u>5,34,000</u>
Loss	<u>17,000</u>

Additional information is as follows:

- (i) Sales for the quarter were 1,200 units. Production was 1,400 units, of which 100 units were scrapped after complete manufacture. The factory capacity is estimated at 2,000 units.]
- (ii) Because of low production, labour efficiency during the quarter is estimated to be 20% below normal level.

You are required to analyse the above and report to the management giving the reasons for the loss.

Answer: Factors causing loss:-

Labour inefficiency Rs. 21,000, units scrapped Rs. 21,000, Undervaluation of closing stock Rs. 3,000, Standard profit Rs. 28,000, Actual Profit (-) Rs. 17,000

(28,000 – 21,000 – 21,000 – 3,000).

Question :13

May 2007

The following information information of a company is available for the year 2006:

	Rs.
Sales	40,000
Raw materials	20,000
Direct wages	6,000
Variable and fixed OH	10,000
Profit	4,000
Units sold	200 Nos.

In the year 2007, wages rate will increase by 50% and fixed cost will decrease by Rs. 600. If 300 units are sold in 2007, the total fixed and variable OH will be 11,400. How many units should be sold in 2007, so that the same amount of profit per unit as in year 2006 may be earned ?

Answer: No. of units: 360

Question :14

Nov. 2007

The working results of a Software Company for two corresponding years are shown below:

	Amount (Rs. in lakhs)	
	Year 2005	Year 2006
Sales (A)	600	770
Cost of Sales:		
Direct materials	300	324
Direct wages and variable overheads	180	206
Fixed overheads	<u>80</u>	<u>150</u>
Total (B)	<u>560</u>	<u>680</u>
Profit (A-B)	<u>40</u>	<u>90</u>

In year 2006, there has been an increase in the selling price by 10 per cent. Following are the details of material consumption and utilization off direct labour hours during the two years:

	Year 2005	Year 2006
Direct material consumption (M.tons)	5,00,000	5,40,000
Direct labour hours	75,00,000	80,00,000

Required:

- Taking year 2005 as base year, analyse the variances of year 2006 and also workout the amount which each variance has contributed to change in profit.
- Find out the breakeven sales for both years.
- Calculate the percentage increase in selling price in the year 2006 that would be needed over the sale value of year 2006 the earn margin of safety of 45 per cent.

Answer: (I) Contribution increase due to volume 20 (F), Sales Price Var. 70 (F), Mat. Usage Var. 26 (F), Direct labour & Var. O/H rate var. 14 (A), Direct labour & var. O/H efficiency var. 18 (F), Fixed O/H Expenditure var. 70 (A); Total increase in profit Rs. 50 laksh. (ii) BEP:- 2005 Rs. 400 lakhs, 2006 Rs. 481.25 lakhs (iii) 4.25%

Special Question

Question :1

(a) The data below relates to a company which makes and sells computers.

	March	April
Sales	5,000 units	10,000 units
Production	10,000	5,000
Selling price/unit	Rs. 100	Rs. 100
Variable production cost/unit	50	50
Fixed production overhead incurred	1,00,000	1,00,000
Fixed production overhead cost per unit, being the predetermined overhead absorption rate selling, distribution and administration cost (all fixed)	10	10
selling, distribution and administration cost (all fixed)	50,000	50,000

You are required to present comparative profit statement for each month using

- (i) Absorption costing, (ii) Marginal costing
 (b) comment on the following statement using the figures contained in your answer to (a)
 "Marginal costing rewards sales whereas absorption costing rewards production."

Answer : (a) Profit of absorption costing 1,50,000 & 3,00,000
(b) Profit of Marginal Costing 1,00,000 & 3,50,000

Question :2

The following is the standard cost data per unit of product "Flex" manufactured by Gama Limited:

Selling price Rs. 40

Costs:

Direct Material 8 Rs.

Direct labour 5

Variable Production Overheads 2

Fixed Production Overheads 5 (Based on a budgeted normal output of 36,000 Units per annum)

Variable Selling Overheads 6

Further the fixed selling expenses were Rs. 1,20,000 per annum

During a particular month, the company produced 2,000 units of the product and sold 1,500 units of the same. There was no opening stock.

You are required to:

- (a) Prepare profit statements under :
 (i) Marginal costing method and (ii) Absorption costing method
 (b) Explain the difference in the profit.

Answer : (a) Profit of Marginal Costing Method = 3,500
(b) Profit of Absorption Costing Method = 6,000

Question :3

The following budgeted profit statement has been prepared using absorption costing principles:

	January to June 1997		July to December 1997	
	Rs. '000	Rs. '000	Rs. '000	Rs. '000
Sales		540		360

Opening stock	100		160
Production costs:			
Direct materials	108		36
Direct labour	162		54
Overhead	<u>90</u>		<u>30</u>
	460		280
Closing stock	<u>160</u>		<u>80</u>
<u>300</u>	<u>200</u>		
Gross Profit		240	160
(Over)/Under-absorption	(12)		12
Selling costs	50		50
Distribution costs	45		40
Administration costs	<u>80</u>		<u>80</u>
		<u>163</u>	<u>182</u>
Net profit/(loss)		<u>77</u>	<u>(22)</u>
Sales units	15,000		10,000
Production units	18,000		6,000

The members of the management team are concerned by the significant changes in profitability between the two six-month periods. As management accountant, you have analysed the data upon which the above budget has been produced, with the following results:

1. The production overhead cost comprise both a fixed and a variable element, the latter appears to be dependent on the number of units produced the. The fixed elements of the cost is expected to be incurred at a constant rate throughout the year.
2. The selling costs are fixed.
3. The distribution cost comprises both fixed and variable elements, the latter appears to be dependent on the number of units sold. The fixed element of the cost is expected to be incurred at a constant rate throughout the year.
4. The administration costs are fixed.

Requirements:

- (a) Present the above budgeted profit statement in marginal costing format.
- (b) Reconcile each of the six-monthly profit/loss values reported respectively under marginal and absorption costing.
- (c) Reconcile the six-monthly profit for January to June 1997 from the absorption costing statement with the six-monthly loss for July to December 1997 from the absorption costing statement.
- (d) Calculate the annual number of units required to break-even.
- (e) Explain briefly the advantages of using marginal costing as the basis of providing managers with information for decision making.

Question :4

(a) PQ Ltd. makes and sells a single product X, and has budgeted the following figures for a one-year period:

Sales in units		<u>1,60,000</u>
Sales		Rs. 64,00,000
Production costs:		
Variable	Rs. 25,60,000	
Fixed	8,00,000	
Selling, distribution and administration costs:		
Variable	12,80,000	
Fixed	<u>12,00,000</u>	
Total costs		<u>58,40,000</u>
Net profit		<u>5,60,000</u>

At the beginning of the year, there were no stocks of finished goods. In the first quarter of the year, 55,000 units were produced and 40,000 units were sold.

You are required to prepare profit statements for the first quarter using:

(i) marginal costing, and (ii) absorption costing

(b) There is a differences in the profit reported when marginal costing is used compared with absorption costing is used.

You are required to discuss the above statement and to indicated how each of the following conditions would affect the net profit reported:

(i) when sales and production are in balance at standard (or expected) volume.

(ii) when sales exceed production,

(iii) When production exceeds sales.

Use the figures from your answer to (a) above to support your discussion, you should also refer to SSAP 9.

Answer: Profit of marginal costing Rs. 1,40,000, Profit of absorption costing Rs. 2,15,000

Question :5

PH Ltd. has a productive capacity of 2,00,000 units of product BXE per annum. The company estimated its normal capacity utilisation at 90% for 1986-97. The variable costs are Rs. 22 per unit and the fixed factory overheads were budgeted at Rs. 7,20,000 per annum. The variable selling overheads amounted to Rs. 6 per unit and the fixed selling expenses were budgeted at Rs. 5,04,000. The operation data for 1986-87 are as under:

Production 1,60,000 units

Sales @ Rs. 40 per unit 1,50,000 units

Operation stock of finished goods 10,000 units

The cost analysis revealed and excess spending of variable factory overheads to the extent of Rs. 80,000. There are no variances in respect of other items of costs.

Required:

- (i) Determine the budgeted break even-point for 1986-87.
- (ii) What increase in price would have been necessary to achieve the budgeted profit?
- (iii) Present statement of profitability for 1986-87 using:
 - (a) Marginal costing basis.
 - (b) Absorption costing basis.

Answer: (i) 1,02,000 units, (ii) Rs. 12,24,000 (iii) (a) Rs. 5,06,000, (b) 5,46,000

Question :6

Wonder Ltd. manufactures a single product, Zest. The following figures relate to Zest for a one year period:

Activity level	50%	100%
Sales and production (units)	400	800
Sales	8.00	16.00
Production costs: Variable	3.20	6.40
Fixed	1.60	1.60
Selling and administration costs:		
Variable	1.60	3.20
Fixed	2.40	2.40

The normal level of activity for the year is 800 units. Fixed costs are incurred evenly throughout the year, and actual fixed costs are the same as budgeted. There were no stocks of Zest at the beginning of the year.

In the quarter, 220 units were produced and 160 units were sold.

Required:

- What would be fixed production costs absorbed by Zest if absorption costing is used?
- What would be the under/over-recovery of overheads during the period?
- What would be the profit using absorption costing?
- What would be the profit using marginal costing?
- Why is there a difference between the answers to (c) and (d)?

Answer: (a) Rs. 44,000 (b) Rs. 4,000 (c) Rs. 40,000 (d) Rs. 28,000

Question :7

(a) Define 'Research and Development Costs'. Explain the treatment of research and development cost in Cost Accounts and set out a procedure for control of such costs.

(b) Mr. Raghavan is quite displeased and frustrated as despite his staff's best efforts, although the sales are increasing the profits are declining over the last three years. He supplies you with the following information and asks your help to clear the picture:

(Rs. In '000)

	1991-92	1992-93	1993-94
Sales (at Rs. 20 per unit)	1,000	1,100	1,200
Costs of production – Variable	260	240	160
Fixed (applied)	390	360	240
Opening inventory (Added)	50	200	250
Closing inventory (Deducted)	(200)	(250)	(50)
	500	550	600
Adjustment for overheads applied	(-) 30	-	(+) 120
Actual cost of goods sold	470	550	720
Gross profit	530	550	480
Less : selling expenses (semi-variable)	490	530	570
Net profit (+)/Loss (-)	(+) 40	(+) 20	(-) 90

Actual production for the last three years were 65,000, 60,000 and 40,000 units respectively. 5,000 units were in stock at the beginning of 1991-92. Fixed manufacturing overheads are applied to production based on planned activity of 60,000 units every year. Actual overheads were Rs. 10,80,000 for past three year period and were evenly incurred.

Answer:	1991-92	1992-93	1993-94
Profit(loss)	(50)	(10)	30
Break-even sales =	56,250 units		

Question :8

The following information related to the first two years of operation for a newly created division of a manufacturing company.

Standard Manufacturing Costs

	Unit Costs
Direct Material	Rs. 4.00
Direct Labour	4.00
Variable Manufacturing Overhead	<u>2.00</u>
Total Variable Manufacturing Cost	10.00
Fixed Manufacturing cost	<u>4.00</u>
Total Manufacturing Cost	<u>14.00</u>
Standard Capacity, --- 2,00,000 units	
Selling Price – Rs. 25 per unit	
Selling and Administration Expenses:	
--Variable Rs. 2.00 per unit of output	

--Fixed Rs. 3,00,000

Production and Sales Statistics:

	Year 1	Year 2
Unit produced	2,20,000	1,70,000
Unit sold	<u>1,80,000</u>	<u>2,00,000</u>
Inventory change	(+) <u>40,000</u>	(-) <u>30,000</u>

Required:

Prepare Comparative Income Statement, for the first two years of operations, using both Absorption Costing and Marginal Costing. Also prepare a statement reconciling the difference in profit, if any, between the two method.

Answer:	Year 1	Year 2
Profit of absorption costing	20,60,000	20,80,000
Profit of marginal costing	19,00,000	22,00,000

Question :9

A manufacturer of glass bottles has been affected by competition from plastic bottles and is currently operating at between 65 and 70 percent of maximum capacity. From the accounting records the following figures were extracted:

Standard cost per gross (A gross is 144 bottles and is the cost unit within the business):

Direct materials	Rs. 8.00
Direct labour	7.20
Variable production overhead	<u>3.36</u>
Total variable production cost	18.56
Fixed production overhead	<u>7.52</u>
Total production standard cost	<u>26.08</u>

❖ The fixed production overhead rate was based on the following computations:

Total annual fixed production overhead was budgeted at Rs. 75,84,000 or Rs. 6,32,000 per month. Production volume was set at 10,08,000 gross bottle or 70 per cent of maximum capacity.

There is slight difference in budgeted fixed production overhead at different levels operating:

Activity level	Amount per month
Percent of maximum capacity	Rs. '000
50 – 75	632
76 – 90	648
91 – 100	656

You may assume that actual fixed production overhead incurred was as budgeted.

Additional information:

	September	October
Gross sold	87,000	1,01,000
Gross produced	1,15,000	78,000
Sale price, per gross	Rs. 32	Rs. 32
Fixed selling costs	1,20,000	1,20,000
Fixed administration costs	80,000	80,000

There were no finished goods in stock at 1 September.

You are required to prepare monthly profit statement for September and October using:

(i) absorption costing; and (ii) marginal costing

Answer:	September	October
Profit of absorption costing	5,23,840	3,52,480

Profit of marginal costing	3,13,280	5,25,440
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Question :10

(a) "The use of the absorption costing method in management decision – making process leads to anomalies" – Discuss.

(b) Topeless Products Ltd has several product lines with a sales manager in charge of each product line and he is paid a bonus based on the net income generated by his product line.

In analysing performance of one product line, the General Sales Manager noted that the sales declined larger bonus that last year because net income increased from Rs. 90,000 last year to Rs. 1,20,000 for the current year.

The general Sales Manager wonders how the product line manager is entitled to a bonus with a decline in sales. He also wants to know how net income increased, when sales declined.

As a Cost accountant **you are required** prepare the income statements, based on which the bonus was paid. Explain with supporting figures why net income increased when sales declined. What do you think of the present method of paying the bonus? Can you suggest some other method?

The data given in support for bonus payment are:

	Year 2	Year 1
Unit sold @ Rs. 20	30,000	40,000
Standard variable cost of production per unit (Rs.)	8	8
Fixed Factory Overhead Cost (Rs.)	2,00,000	2,00,000
Selling & distribution Expenses (assumed to be fixed) (Rs.)	1,40,000	1,40,000
Standard Fixed Factory Overheads per unit (Rs.)	5	5
Units produced	50,000	30,000
Opening finished goods inventory – Units		10,000

All factory overhead variances are written off to cost of goods sold.

Answer :

Question :11

Jay Kay Limited is a single product manufacturing company. The following information related to the months of May and June 2003:

	May (Rs.)	June (Rs.)
(i) Budgeted Costs and Selling Prices;		
Variable manufacturing cost per unit	2.00	2.20
Total fixed manufacturing cost (based on budgeted output of 25,000 units per month)	40,000	44,000
Total fixed marketing cost	14,000	15,400
Selling price per unit	5.00	5.50
(ii) Actual production and sales:		
	Units	Units
Production	24,000	24,000
Sales	21,000	26,500

(iii) There was no stock of finished goods at the beginning of May 2003. There was no wastage or loss of finished goods during May or June 2003.

(iv) Actual costs incurred corresponded to those budgeted for each month.

You are required to calculate the relative effects on the monthly operating profits of applying: (a) absorption costing (b) marginal costing.

Answer: Net Profit (a) May Rs. 13,800, June Rs. 24,730 (b) May Rs. 9,000, June Rs. 28,650

Question :12

A company has produced 1,500 units against a budgeted quantity of 2,000 units. Actual sales were 1,300 units. The company's policy is to value stocks at standard absorption cost.

Other data are:

Direct material	Rs. 100 per unit
Direct labour	Rs. 100 per unit at normal efficiency
Variable O/H	Rs. 50 per unit
Fixed O/H at budgeted capacity	Rs. 1,00,000
Variable selling O/H	Rs. 26,000
Budgeted fixed selling O/H	Rs. 30,000
Actual fixed selling O/H	Rs. 25,000
Selling price	Rs. 400 per unit

There was no opening stock.

- (i) Present the profitability statement under absorption costing system.
- (ii) Assuming actual labour was 25% below normal efficiency and that 100 units of production had to be scrapped after complete manufacture, computed the actual profit or loss.
- (iii) Reconcile the profits under (i) and (ii) above

Answer: Profitability under absorption costing system : Rs. 54,000, Actual loss : Rs. 26,000

Chapter – 7

Cost Volume Profit Analysis

Question :1

Nov. 1986

(a) Calcutta Company Ltd. manufactures and sells four types of products under the brand names ACE, UTILITY, LUXURY and SUPREME. The sales mix in value comprises of:-

Brand	Percentage
ACE	33 $\frac{1}{3}$ %
UTILITY	41 $\frac{2}{3}$ %
LUXURY	16 $\frac{2}{3}$ %
SUPREME	8 $\frac{1}{3}$ %
	<u>100%</u>

The total budgeted Sales (100%) are Rs. 6,00,000 per month.

The operating costs are:-

ACE	60% of selling price
UTILITY	68% of selling price
LUXURY	80% of selling price
SUPREME	40% of selling price

The fixed costs are Rs. 1,59,000 per month. Calculate the break-even point for the products on an overall basis.

(b) it has been proposed to change the sales mix as follows, the total sales per month remaining Rs. 6,00,000:-

Brand	Percentage
ACE	25%
UTILITY	40%
LUXURY	30%
SUPREME	5%
	<u>100%</u>

Assuming that this proposal is implemented, calculate the new break-even point.

Answer:(a) BEP (Sales value) – Rs. 4,54,286; (b) New BEP (Sales value) – Rs. 5,00,000.

Question :2

May 1987

Gemini Publishers Ltd. is considering launching a new monthly magazine at a selling price of Rs. 10 per copy. Sales of the magazine are expected to be 5,00,000 copies per month, but it is possible that the actual sales could differ quite significantly from this estimate.

Two different methods of producing the magazine are being considered and neither would involve any additional capital expenditure. The estimated production cost for each of the two methods of manufacture, together with the additional marketing and distribution costs of selling the new magazine, are given below:-

	Method A	Method B
Variable costs	Rs. 5.50 per copy	Rs. 5.00 per copy
Specific fixed costs	Rs. 8,00,000 per month	Rs. 12,00,000 per month

Semi- variable Costs:

The following estimates have been available:-

3,50,000 copies	Rs. 5,50,000 per month	Rs. 4,75,000 per month
4,50,000 copies	Rs. 6,50,000 per month	Rs. 5,25,000 per month

month month
It may be assumed that the fixed cost content of the semi-variable cost will remain constant throughout the range of activity shown.

The company currently sells a magazine covering related topics to those that will be included in the new publication, and consequently, it is anticipated that sales of this existing magazine will be adversely affected. It is estimated that for every ten copies sold of the new publication, sales of the existing magazines will be reduced by one copy.

Sales and cost data of the existing magazines are as shown below:-

Sales	Rs. 2,20,000 copies per month
Selling price	Rs. 8.50 per copy
Variable costs	Rs. 3.50 per copy
Specific fixed costs	Rs. 8,00,000 per month

Required:

- Calculate, for each production the net increase in company profits which will result from the introduction of the new magazine, at each of the following levels of activity:-
 5,00,000 copies per month
 4,00,000 copies per month
 6,00,000 copies per month
- Calculate, for each production method, the amount by which sales volume of the new magazine could decline from the anticipated 5,00,000 copies month, before the company makes no additional profit from the introducing of the new publication.
- Briefly identify any conclusions which may be drawn from your calculations.

Answer:			
(a) Levels of Activity (Copies)	5,00,000	4,00,000	6,00,000
Method A Net increase in Profits (Rs.)	5,00,000	2,00,000	8,00,000
Method B Net increase in Profits (Rs.)	5,00,000	1,00,000	9,00,000
(b) Break-even point: Method A 8,33,333 Copies; Method B 3,75,000 Copies.			

Question :3 **Nov. 1987**

A company has an opening stock of 6,000 units of output. The production planned for the current period is 24,000 units and expected sales for the current period amount to 28,000 units. The selling price per unit of output is Rs. 10. Variable cost per unit is expected to be Rs. 6 per units while it was only Rs. 5 per unit during the previous period. What is the Break-Even volume for the current period if the total fixed costs for the current period is Rs. 86,000?

Assume that the FIFO System is followed.

Answer: Break-even volume in units – 20,000.

Question :4 **Nov. 1988**

Ever Forward Ltd. is manufacturing and selling two products: Splash and Flash at selling prices of Rs. 3 and Rs. 4 respectively. The following sales strategy has been outlined for the year 1989:-

- Sales planned for year will be Rs. 7.20 lakhs in the case of Splash and Rs. 3.50 lakhs in the case of Flash.
- To meet competition, the selling price of Splash will be reduced by 20% and that of Flash by 12.5%.
- Break-even is planned at 60% of the total sales of each product.

- (iv) Profit for the year to be achieved is planned as Rs. 69,120 in the case of Splash and Rs. 17,500 in the case of Flash. This would be possible by launching a cost reduction programme and reducing the present annual fixed expenses of Rs. 1,35,000 allocated as Rs. 1,08,000 to Splash and Rs. 27,000 to Flash.

You are required to present the proposal in financial terms giving clearly the following information:-

- Number of units to be sold of Splash and Flash to break – even as well as the total number of units of Splash and Flash to be sold during the year.
- Reduction in fixed expenses product-wise that is envisaged by the Cost Reduction Programme.

Answer: (a) Splash: Rs. 1,80,000; Flash Rs. 60,000.
(b) Splash: Rs. 4,320; Flash: Rs. 750.

Question :5

Nov. 1989

A company proposes to install a machine for the manufacture of a component which at present is being purchased at Rs. 24 each. There are two alternatives, namely (a) installation of an automatic machine and (b) installation of a semi-automatic machine. The details of the two machines are as under:

	Automatic Machine	Semi-Automatic Machine
Initial cost of the machine (Rs.)	9,00,000	6,00,000
Life	10 years	10 years
Fixed overheads other than depreciation on machine (per annum) (Rs.)	1,62,000	84,000
Variable expenses of the component (Rs.)	12	15

The company charges depreciation on straight line method. Scrap value of the machine at the end of life is nil.

The demand for the components at present is 20,000 units per annum. This demand is expected to increase to 40,000 units.

Required:

- For each of the two volumes of output namely 20,000 and 40,000 units, state with supporting calculation whether the components should be purchased or manufactured by installation of machine. If your decision is in favour of installation of machine, which model will you advise?
- At what volume of output should the company change over from purchase of components to manufacture by installation of (i) semi-automatic machine and (ii) automatic machine.
- At what volume of manufacture of the components will the company switch over from installation of one type of machine to the other?

Answer: (a) At the volume of 20,000 units, cost of manufacturing is less by semi-automatic machine. Hence semi-automatic machine should be installed. At the volume of 40,000 units, cost of manufacture is less by automatic machine. Hence installation of automatic machine is recommended; (b) Automatic – 21,000 units; Semi-automatic -16,000 units; (c) Differential variable cost Rs. 3; Fixed cost Rs. 1,08,000.

Question :6

May 1990

Nukshan Ltd. which makes only one product, sells 10,000 units of its product making a loss of Rs. 10,000. The variable cost per unit of the product is Rs. 8 and the fixed cost is Rs. 30,000.

The company has estimated its sale demand as under:

Sales units	Probability
10,000	0.10
12,000	0.15
14,000	0.20
16,000	0.30
18,000	0.25

What is the probability that the company will continue to make losses?

What is the probability that the company will make a profit of least Rs. 6,000?

Answer: The probability of loss is 0.45; the probability of making a profit of atleast Rs. 6,000 is 0.25

Question :7

Nov. 1990

Paramount Food Products is a new entrant in the market for chocolates. It has introduced a new product-Sweetee. This is a small rectangular chocolate bar. The bars are wrapped in aluminium foil and packed in attractive cartons containing 50 bars. A carton, is therefore, considered the basic sales unit. Although management had made detailed estimates of costs and volumes prior to undertaking this venture, new projections based on actual cost experience are now required.

Income Statement for the last two quarters are each thought to be representative of costs of the costs and productive efficiency we can expect in the next few quarters. There were virtually no inventories on hand at the end of each quarter. The income statements reveal the following:-

	First Quarter Rs.	Second Quarter Rs.
Sales:		
50,000 x Rs. 24	12,00,000	-
70,000 x Rs. 24	-	16,80,000
Cost of Goods Sold	<u>7,00,000</u>	<u>8,80,000</u>
Gross Margin	5,00,000	8,00,000
Selling and Administration	<u>6,50,000</u>	<u>6,90,000</u>
Net Income (Loss) before taxes	(1,50,000)	1,10,000
Tax (negative)	<u>(60,000)</u>	<u>44,000</u>
Net Income (Loss)	(90,000)	66,000

The firm's overall marginal and average income-tax rate is 40%. This 40% figure has been used to estimate the tax liability arising from the chocolate operations.

Required:

- Management would like to know the break-even point in terms of quarterly carton sales for the chocolates.
- Management estimates that there is an investment of Rs. 30,00,000 in this product line. What quarterly carton sales and total revenue are required in each quarter to earn an after-tax return of 20% per annum on investment?
- The firm's marketing people predict that if the selling price is reduced by Rs. 1.50 per carton (Rs. 0.03 off per chocolate bar) and a Rs. 1,50,000 advertising campaign among school children is mounted, sales will increase by 20% over the second quarter sales. Should the plan be implemented?

Answer: (a) B. E. unit 61,539 cartons; (b) Rs. 19,38,450; (c) Plan should not be implemented.

Question :8

Nov. 1991

Perfect Pistons Ltd. produces 60,000 pistons per annum for its parent company Perfect Motors Ltd. The pistons are sold to Perfect Motors at Rs. 200 per unit. The variable cost per piston is Rs. 180. The annual fixed cost of Perfect Pistons Ltd. is Rs. 15 lakhs and it is currently operation at 60% capacity.

The company desires to respond to an export enquiry for 30,000 pistons of the type it is currently manufacturing. The Company's utilisation and avoid loss.

You have to take note of the following benefits that will accrue to the export transaction, while determining the F.O.B. price to be quoted.

- (i) Export incentive by way of cash assistance at 10% of F.O.B. value of exports.
- (ii) Reimbursement of excise duty on manufacturing inputs by way of 5% drawback of duty on F.O.B. value of exports.
- (iii) Entitlement of import licence to the extent of 10% on F.O.B. value of exports. The imports. The import licence can either be sold at a premium of 100% or it can be utilised to import certain critical auto components that will yield a 30% profit on cost.

Recommend the bare minimum price that the company should quote, in order to break-even, assuming:

- (a) It sells the import licence in the market,
- (b) It imports components against the licence and sells them for profit.

Answer: (a) Bare minimum F.O.B. price to be quoted Rs. 152
(b) Bare minimum F.O.B. price to be quoted Rs. 161.02

Question :9 **May 1993**

The budgeted results of A Ltd. are as under:

Product	Sales Values (Rs.)	P/V Ratio (%)
X	2,50,000	50
Y	4,00,000	40
Z	6,00,000	30

Fixed overheads for the period Rs. 5,02,200.

The management is worried about the results. You are required to prepare a statement showing the amount of loss, if any, being incurred at present and recommend a change in the sale value of each product as well as in the total sales value maintaining the same sales-mix, which will eliminate the said loss.

Answer: Loss Rs. 37,200 combined P/V Ratio 37.2%.

Question :10 **Nov. 1993**

Y Ltd., produces P, Q and R. The following are the results for the year ending 31st March, 1993:-

Products	Sales Rs.	Marginal Cost Rs.
P	1,00,000	30,000
Q	50,000	30,000
R	<u>50,000</u>	<u>60,000</u>
Total	<u>2,00,000</u>	<u>1,20,000</u>

Fixed overheads were Rs. 50,000 during 1992-93.

Draw a profit graph plotting the profits for each product as well as for the company as a whole. Also ascertain the break-even point of sales from the graph.

Answer: BEP – Rs. 1,25,000 (sales).

Question :11**May 1998**

ACE Office Supplies Corporation retails two products – a standard and a deluxe version of a designer gall point pen. The budgeted income statement is as under:

	Standard	Deluxe	Total
Sales (in units)	1,50,000	50,000	2,00,000
	Rs.	Rs.	Rs.
Sales: @ Rs. 20 per unit	30,00,000	-	45,00,000
@ Rs. 30 per unit	-	15,00,000	-
Variable Costs:			
at Rs. 14 per unit	21,00,000	-	-
at Rs. 18 per unit	-	9,00,000	30,00,000
Contribution	9,00,000	6,00,000	15,00,000
Fixed Cost			12,00,000
Profit			3,00,000

Required:

- Calculate the break-even point in units assuming that the planned sales mix is maintained.
- Calculate the break-even point in units:
 - If only standard version is sold, and
 - If only deluxe version is sold.
- Suppose 2,00,000 units are sold, but only 20,000 units are deluxe quality. Calculate the profit. Calculate the BEP if these relationship persist in the next accounting period. Compare your answer with the original plan and the answer in requirement(b). what is your major finding?

Answer: (i) BEP – Deluxe ball pen 40,000 units & standard ball pen 1,20,000 units; (ii) Break-even in units if only standard version is sold – 2,00,000, if only Deluxe version is sold – 1,00,000; (iii) Profit – Rs. 1,20,000, BEP (if the relationship persists) Deluxe ball pen – 18,182 units & Standard ball pen 1,63,638 units.

Question :12**May 1999**

Anuradha Enterprises manufactures and sells black phenyl worth Rs. 20,000, white phenyl worth Rs. 25,000, scented phenyl worth 10,000 and naphthalene balls worth Rs. 5,000 every month. The firm's total costs per month are Rs. 14,700. The variable costs are: on black phenyl 60%, on white phenyl 68%, on scented phenyl 80% and on naphthalene balls 40%.

The proprietrix, Ms. Anuradha Shah, being basically a science graduate, wonders at what combined sales volume does she really start earning profit. Please help her in arriving at such a sales volume.

Answer: Profit will be earned if its combined sales volume increases above Rs. 42,000.

Question :13**Nov. 1999**

Satish Enterprises are leading exporters of Kid's Toys. J Ltd. of U.S.A. have approached Satish Enterprises for Exporting a special toy named "Jumping Monkey". The order will be valid for next three years at 3,000 toys per month. The export price of the toy will be \$4.

Cost data per toy is as follows;

	Rs.
Materials	60
Labour	25
Variable overheads	20
Primary packing of the toy	15

The toys will be packed in lots of 50 each. For this purpose a special box, which will contain the 50 toys will have to be purchased, cost being Rs. 400 per box.

Satish Enterprises will also have to import a special machine for making the toys. The cost of the machine is Rs. 24,00,000 and duty thereon will be at 12%. The machine will have an effective life of 3 years and depreciation is to be charged on straight line method. Apart from depreciation, annual fixed overheads is estimated at Rs. 4,00,000 for the first year with 6% increase in the second year. Fixed overheads are incurred uniformly over the year.

Assuming the average conversion rate to be Rs. 50 per \$, you are required to:

- Prepare a monthly and yearly profitability statements for the first year and second year assuming the production at 3,000 toys per month.
- Compute a monthly and yearly break-even units in respect of the first year.
- In what contingency can there be a second break-even point for the month and for the year as a whole?
- Have you any comments to offer on the above?

**Answer: (i) First years profit Rs. 1,296, Second year's profit Rs. 1,272;
(ii) Monthly B-E units 1,500 units, Yearly B-E units 18,000 units.**

Question :14

May 2000

The working results of a company for two corresponding years are shown below:

	Year 1	Year 2
	Rs. in lakhs	Rs. in lakhs
Sales	<u>1,200</u>	<u>1,540</u>
Direct material	600	648
Direct wages and variable overheads	360	412
Fixed overheads	<u>160</u>	<u>300</u>
	<u>1,120</u>	<u>1,360</u>
Profit	80	180

In year 2, there has been an increase in the selling price by 10%. Following are the details of material consumption and utilisation of direct labour hours during the two years.

	Year 1	Year 2
Direct material consumption in m/t	5,00,000	5,40,000
Direct labour hours	75,00,000	80,00,000

You are required to:

- Keeping year 1 as base year, analyse the results of year 2 and work out the amount which each factor has contributed to change in profit.
- Find out the break even sales for both years.
- Calculate the percentage increase in selling price that would be needed over the sale value of year 2 to earn a margin of safety of 45%.

**Answer: (ii) Break-even sales for year 1 is Rs. 800 lakhs and for year 2 is Rs. 962.50 lakhs;;
(iii) 4.25%**

Question :15

Nov. 2002

A hospital operates a 40 bed capacity special health care April 7, 2003 department. The said department levies a charge of Rs. 425 per bed day from patient using its services. The data relating to fees collected and costs for the year 2001 are as under:

	Rs.
Fees collected during the year	34,95,625
Variable costs based on patient days	13,57,125

Departmental fixed costs 6,22,500

Apportioned costs of the hospital administration charges 10,00,000

Besides the above, nursing staff were employed as per the following scale at Rs. 48,000 per annum per nurse.

Annual Patient days	No. of Nurses required
Less than 5000	3
5000 – 7000	4
7000 – 9000	6
Above 9000	8

The projections for the year 2002 are as under:

- The costs others than apportioned overheads will go up by 10%.
- The apportioned overheads will increase by Rs. 2,50,000 per annum.
- The salary of the nursing staff will increase to Rs. 54,000 per annum per nurse.

The occupancy of the bed capacity is not likely to increase in 2002 and consequently the management is actively considering a proposal to close down the department. In that event, the departmental fixed costs can be avoided.

Required:

- (i) Present statement to show the profitability of the department for the years 2001 and 2002.
- (ii) Calculate the:
 - Break-even bed capacity for the year 2002
 - Increase in fee per day required to justify continuance of the department.

Answer: (i) Profit for 2001 is Rs. 2,28,000, for 2002 loss is Rs. 2,55,962;

(iii) Break-even point is 9,720 bed days, Increase in fee per bed days Rs. 31.12.

Question :16

Nov. 2006

X Ltd. manufactures a semiconductor for which the cost and price structure is given below:

	Rs. per unit
Selling price	500
Direct material	150
Direct labour	100
Variable overhead	50
Fixed cost = Rs. 2 lacs.	

The product is manufactured by a machine, whose spare part costing Rs. 2,000 needs replacement after every 100 pieces of output. This is in addition to the above costs. Assume that no defectives are produced and that the spare part is readily available in the market at all times at Rs. 2,000.

- (i) Prepare the profitability statement for production levels of 2,000 units and 3,000 units, when fixed cost = Rs. 1 lacs.
- (ii) What is the break-even point (BEP) for the above data?
- (iii) Comment on the BEP, if the fixed cost can be reduced to Rs. 1,80,000 from the existing level of 2 lacs.

Answer: (i) Profit: at 2,000 units Rs. 2.6 lacs, at 3,000 units Rs. 4.4 lacs,

(ii) BEP 560 units and 1120 units, (iii) BEP 1000 units and 1010 units.

Question :17

May 2007

A company makes 1,500 units of a product for which the profitability is given below:
Rs.

Sales		1,20,00
Direct materials	30,000	
Direct labour	36,000	
Variable OH	<u>15,000</u>	
Subtotal variable cost		81,000
Fixed cost	<u>16,800</u>	
Total cost		<u>97,800</u>
Profit		<u>22,200</u>

After the first 500 units of production, the company has to pay a premium of Rs. 6 per unit towards overtime labour. The premium so paid has been included in the direct labour cost of Rs. 36,000 given above.

You are required to compute the Break-even point.

Answer: Break-even point is 575 units.

Question :18

(I.C.W.A. Final June 1981; I.C.W.A. Inter, December 1987;
C.A. Inter, November 1986; May 1983; I.C.W.A. Final December 1992;

Two manufacturing companies which have the following operating details decide to merge:

	Company 1	Company 2
Capacity utilization %	90	60
Sales (Rs. lakhs)	540	360
Variable Costs (Rs. lakhs)	396	225
Fixed Costs (Rs. lakhs)	80	50

Assuming that the proposal is implemented, calculate:

- Break-even sales of the merged plant and the capacity utilization at that stage.
- Profitability of the merged plant at 80% capacity utilization.
- Sales turnover of the merged plant to earn a profit of Rs. 75 lakhs.
- When the merged plant is working at a capacity to earn a profit of Rs. 75 lakhs, what percentage increase in selling price is required to sustain as increase of 5% in fixed overheads.

Answer: (i) BEP of the merged plant = Rs. 501.74 (ii) 98 (iii) 791.20 lakh (iv) .8214

Question :19

A,B, and C are three similar plants under the same management who want them to merge for better operation. The details are as under:

Plant	A	B	C
Capacity operated	100%	70%	50%
	Rs.	Rs.	Rs.
	(In lakh)	(In lakh)	(In lakh)
Turnover	300	280	150
Variable cost	200	210	75
Fixed cost	70	50	62

Find out:

- The capacity of the merged plant for break even.
- The profit at 75% capacity of the merged plant.

- (iii) The turnover, from the merged plant to give a profit of Rs. 28 lakh.
(iv)

Answer: (i) 52%, (ii) Profit Rs. 80.5 lakh, (iii) Rs. 600 lakhs

Question :20

CA Final, Nov. 1996

You have been approached by a friend who is seeking your advice as to whether he should give up his job as an engineer, with a current salary of Rs. 14,800 per month and go into business on his own, assembling and selling a component from a supplier.

It is very difficult to forecast the sales potential of the component, but after some research, your friend has estimated the sales as follows:

- (i) Between 600 and 900 components per month at a selling price of Rs. 250 per component.
- (ii) Between 901 and 1,250 components per month at a selling price of Rs. 220 per component for the entire lot.

The cost of the parts required would be Rs. 140 for each completed component. However, if more than 1,000 components are produced in each month, a discount of 5% would be received from the supplier of parts on all purchases.

Assembly cost would be Rs. 60,000 per month up to 750 components. Beyond this level of activity assembly costs would increase to Rs. 70,000 per month.

Your friend has already spent Rs. 30,000 on development, which he would write-off over the first five years of the venture.

Required:

- (i) Calculate for each of the possible sales levels at which your friend could expect to benefit by going into the venture on his own.
- (ii) Calculate the BEP of the venture of each of the selling price.
- (iii) Advise your friend as to the viability of the venture.

Question :21

CA, Nov. 2000

A company manufactures a product, currently utilizing 80% capacity with a turnover of Rs. 8,00,000 at 25 per unit. The cost data are as under:

Material cost Rs. 7.50 per unit, Labour cost Rs. 6.25 per unit.

Semi-variable cost (Including variable cost of Rs. 3.75 per unit) Rs. 1,80,000.

Fixed cost Rs. 90,000 up to 80% level of output, beyond this an additional Rs. 20,000 will be incurred.

Calculate:

- (i) Activity level at BEP.
- (ii) Number of units to be sold to earn a net income of 8% of sales.
- (iii) Activity level needed to earn a profit of Rs. 95,000.
- (iv) What should be the selling price per unit, if BEP is to be brought down to 40% activity level?

Question :22

CIMA London, Nov. 1996

Z plc operates as single retail outlet selling direct to the public. Profit statement for August and September 1996 areas follows:

	August	September
Sales	Rs. 80,000	Rs. 90,000
Cost of sales	<u>50,000</u>	<u>55,000</u>
Gross profit	30,000	35,000
Less:		
Selling and distribution	8,000	9,000

Administration	<u>15,000</u>	<u>15,000</u>
Net profit	<u>7,000</u>	<u>11,000</u>

Requirements:

- Use the high and low points technique to identify the behavior of
 - Cost of sales
 - Selling and distribution costs, and
 - Administration costs.
- Using the graph paper provided, draw a contribution break-even and identify the monthly break-even sales value, and area of contribution.
- Assuming a margin of safety equal to 30% of the break-even value, calculate Z plc's annual profit.
- Z plc is now considering opening another retail outlet selling the same products. Z plc plans to use the same profit margins in both outlets and has estimated that the specific fixed costs of the second outlet will be Rs. 1,00,000 per annum.

Z plc also expects that 10% of its annual sales from its existing outlet would transfer to this second outlet if it were to be opened.

Calculate the annual value of sales required from the new outlet in order to achieve the same annual profit as previously obtained from the single outlet.

Question :23

In a recent period Zack company had the following experience:

Sales (10000 units @ Rs. 200)			(Rs.) 20,00,000
Costs:	Fixed Rs.	Variable Rs.	
Direct material	-	2,00,000	
Direct labour	-	4,00,000	
Factory overhead	1,60,000	6,00,000	
Administrative expenses	1,80,000	80,000	
Other expenses	<u>2,00,000</u>	<u>1,20,000</u>	
Total costs	5,40,000	14,00,000	<u>19,40,000</u>
Net earnings			<u>60,000</u>

Required:

- Calculate the break-even point for Zack in units and in rupees. Show your calculations and use the contribution margin ratio to find the rupee break-even.
- What sales in rupees would be required to generate a net income of Rs. 96,000?
- What will be the break-even point in units if fixed costs are increased by Rs. 18,000?

Question :24

Nov. 1990

Paramount Food Products is a new entrant in the market for chocolates. It has introduced a new product-Sweetee. This is a small rectangular chocolate bar. The bars are wrapped in aluminium foil and packed in attractive cartons containing 50 bars. A carton, is therefore, considered the basic sales unit. Although management had made detailed estimates of costs and volumes prior to undertaking this venture, new projections based on actual cost experience are now required.

Income Statement for the last two quarters are each thought to be representative of costs of the costs and productive efficiency we can expect in the next few quarters. There were virtually no inventories on hand at the end of each quarter. The income statements reveal the following:-

	First Quarter Rs.	Second Quarter Rs.
Sales:		
50,000 x Rs. 24	12,00,000	-
70,000 x Rs. 24	-	16,80,000
Cost of Goods Sold	<u>7,00,000</u>	<u>8,80,000</u>
Gross Margin	5,00,000	8,00,000
Selling and Administration	<u>6,50,000</u>	<u>6,90,000</u>
Net Income (Loss) before taxes	(1,50,000)	1,10,000
Tax (negative)	<u>(60,000)</u>	<u>44,000</u>
Net Income (Loss)	(90,000)	66,000

The firm's overall marginal and average income-tax rate is 40%. This 40% figure has been used to estimate the tax liability arising from the chocolate operations.

Required:

- Management would like to know the break-even point in terms of quarterly carton sales for the chocolates.
- Management estimates that there is an investment of Rs. 30,00,000 in this product line. What quarterly carton sales and total revenue are required in each quarter to earn an after-tax return of 20% per annum on investment?
- The firm's marketing people predict that if the selling price is reduced by Rs. 1.50 per carton (Rs. 0.03 off per chocolate bar) and a Rs. 1,50,000 advertising campaign among school children is mounted, sales will increase by 20% over the second quarter sales. Should the plan be implemented?

Answer: (a) B. E. unit 61,539 cartons; (b) Rs. 19,38,450; (c) Plan should not be implemented.

Question :25

ICWA Final, Dec. 1996; CA Inter, May 1987

A Bank conducts competitive examination every year for selection of candidates for the post of Probationary officers. Each candidate is charged an entrance fee of Rs. 75 for admission to the examination. Data gathered from the last two years are as under:

	1991 Rs.	1992
Fees collected	<u>Rs. 3,00,000</u>	<u>3,75,000</u>
Cost:		
Valuation of answer books	1,20,000	1,50,000
Question papers	80,000	1,00,000
Hire of hall	12,000	12,000
Honorarium to Examination Superintendent	10,000	10,000
Invigilators at the rate of one invigilator for every 50 students at Rs. 100 per day for 2 days	16,000	20,000
General expenses	<u>12,000</u>	<u>12,000</u>
Total	<u>2,50,000</u>	<u>3,04,000</u>
Net Income	50,000	71,000

In 1993, it is expected that 6,000 candidates will appear for the entrance examination. The hall rent and general expenses are expected to increase by Rs. 3,000 and Rs. 8,000 respectively.

You are required to calculate the following for 1993:

- Budgeted income;
- Break-even number of candidates;

- (iii) Number of students required to sit for examination to earn a net revenue of Rs. 1,00,000.

Question :26

Nov. 1990

Navbharat Commerce College, Bombay has six sections of B.Com and two sections of M.Com with 40 and 30 students per section respectively. The college plans one day pleasure trip around the city for the students once in an academic session during break to visit park, zoo, planetarium and aquarium.

A transporter uses to provide the required number of buses at a flat rate of Rs. 700 per bus for the aforesaid purpose. In addition, a special permit fee of Rs. 50 per bus is required to be deposited with city municipal corporation. Each bus is 52 seater. Two seats are reserved for teacher who accompany in each bus. Each teacher is paid daily allowance of Rs. 100 for the day. No other costs in respect of teachers are relevant to the trip.

The approved caterers of the college supply breakfast, lunch and afternoon tea respectively at Rs. 7, Rs. 30 and Rs. 3 per student.

No entrance fee is charged at the park. Entrance fees come to Rs. 5 per student both for the Zoo and the aquarium. As regards planetarium, the authorities charge block entrance fee as under for group of students of educational institutions depending upon the number of students in group:

Number of student in a group	Block entrance fee
Up to 100	Rs. 200
101-200	300
201 & above	450

Cost of prizes to be awarded to the winners in different games being arranged in the part depend upon the strength of students in trip. Cost of prizes to be distributed are:

Number of Students in a Trip	Cost of Prizes
Up to 50	Rs. 900
51-125	1,050
126-150	1,200
151-200	1,300
201-250	1,400
251 % above	1,500

To meet the above costs the college collects Rs. 65 from each students who wish to join the trip. The college releases subsidy of Rs. 10 per students in the trip towards it.

You are required:

- Prepare a tabulated statement showing total costs at the levels of 60, 120, 180, 240 and 300 students indicating each item of cost.
- Compute average cost per students at each at each of the above levels.
- Calculate the number of students to break even for the trip as the college suffered loss during the previous year despite 72% of the students having joined the trip.

Question :27

ICWA Final, June 1999; CA Final Nov. 2000

The Recovery General Hospital operates a separate department specifically for private health patients. In 2002 the patients paid a fixed fee of Rs. 850 per day for the use of hospital facilities and this is expected to remain unchanged for the year 2003. In addition, the patients pay an extra fee to the physicians for their services. This is a private arrangement between the patient and the physician, and has no effect on the finances of the hospital. For the year ending 31

December 2002 the department expected to receive a revenue of Rs. 1,39,61,250 for private health care. Expenditure chargeable to the department for the year 2002 will be as follows:

Particulars	Basis of Allocation	
	Patient Days	Bed Capacity
Meals	22,00,000	-
Porter's salaries	-	1,20,000
Laundry	12,00,000	-
Laboratory	26,00,000	-
Maintenance	3,70,000	-
General administrative services	-	23,70,000
Other expenses	2,00,000	-
	65,70,000*	24,90,000

* All variable expenses

It is estimated that all cost will increase by 10% in the year 2003. In addition, rent and rates amounting to Rs. 40,00,000 was charged directly to the department, since it is the sole occupier of a separate building within the hospital grounds. This is expected to increase to Rs. 50,00,000 for the year 2003.

The salaries of the nursing staff are charged to the department at the end of the year according to the following schedule:

Annual Patient Days	Nurses supplied
Less than 7,000	3
7,000-10,000	4
10,000-13,000	5
Over 13,000	8

The average salary of the nursing staff for the year 2002 is estimated at Rs/ 70,000 per annum (actual for the year 2002 was Rs. 65,000 p.a.) the department has a maximum capacity of 60 beds, but in the year 2002 a number of beds were unoccupied because of insufficient demand and there have been demand from a number of parties that the department is losing money and should be closed down.

You are required to find the break-even point to cover

- All fixed costs for next year
- Fixed cost specific to the private department.

You are also required to find out the requisite fees per patient day for break-even in the year 2003, (Assuming demand to be same as in the year 2002).

[Note : Please adopt 365 days to a calendar year.]

Question :28

Nov. 2002

A hospital operates a 40 bed capacity special health care April 7, 2003 department. The said department levies a charge of Rs. 425 per bed day from patient using its services. The data relating to fees collected and costs for the year 2001 are as under:

	Rs.
Fees collected during the year	34,95,625
Variable costs based on patient days	13,57,125
Departmental fixed costs	6,22,500
Apportioned costs of the hospital administration charges	10,00,000

Besides the above, nursing staff were employed as per the following scale at Rs. 48,000 per annum per nurse.

Annual Patient days	No. of Nurses required
Less than 5000	3
5000 – 7000	4
7000 – 9000	6
Above 9000	8

The projections for the year 2002 are as under:

- The costs others than apportioned overheads will go up by 10%.
- The apportioned overheads will increase by Rs. 2,50,000 per annum.
- The salary of the nursing staff will increase to Rs. 54,000 per annum per nurse.

The occupancy of the bed capacity is not likely to increase in 2002 and consequently the management is actively considering a proposal to close down the department. In that event, the departmental fixed costs can be avoided.

Required:

- (iv) Present statement to show the profitability of the department for the years 2001 and 2002.
- (v) Calculate the:
 - Break-even bed capacity for the year 2002
 - Increase in fee per day required to justify continuance of the department.

**Answer: (i) Profit for 2001 is Rs. 2,28,000, for 2002 loss is Rs. 2,55,962;
(vi) Break-even point is 9,720 bed days, Increase in fee per bed days Rs. 31.12.**

Question :29

X Ltd. manufactures a semiconductor for which the cost and price structure is given below:

	Rs. per unit
Selling price	500
Direct material	150
Direct labour	100
Variable overhead	50
Fixed cost = Rs. 2 lacs.	

The product is manufactured by a machine, whose spare part costing Rs. 2,000 needs replacement after every 100 pieces of output. This is in addition to the above costs. Assume that no defectives are produced and that the spare part is readily available in the market at all times at Rs. 2,000.

- (iv) Prepare the profitability statement for production levels of 2,000 units and 3,000 units, when fixed cost = Rs. 1 lacs.
- (v) What is the break-even point (BEP) for the above data?
- (vi) Comment on the BEP, if the fixed cost can be reduced to Rs. 1,80,000 from the existing level of 2 lacs.

**Answer: (i) Profit: at 2,000 units Rs. 2.6 lacs, at 3,000 units Rs. 4.4 lacs,
(ii) BEP 560 units and 1120 units, (iii) BEP 1000 units and 1010 units.**

Self Practice

Question :1

ICWA Inter June 1993

A factory engaged in manufacturing plastic buckets is working at 40% capacity and produced 10,000 buckets per month. The present cost break-up for one bucket is as under:

Materials	Rs. 20
Labour	Rs. 6
Overheads	Rs. 10 (60% fixed)

The selling price is Rs. 40 per bucket. If it is decided to work the factory at 50% capacity, the selling price falls by 3%. At 90% capacity, the selling price falls by 5% accompanied by a similar fall in the price of materials.

Your are required to prepare a statement showing the profits at 50% and 90% capacities and also determine the break-even points at each of these production levels.

Question :2

CA Inter, Dec. 1988

The executive of B co, a small manufacturer of one product, are developing the annual profit plan. They have just reviewed the 'first cut' at the annual income statement and are concerned with the Rs. 1,10,000 indicated profit on a sales volume of 20,000 units. The fixed cost structure of Rs. 9,90,000 appears to be high and they have some doubts about departing from the unit sales price of Rs. 100. There is a general agreement that the "profit target should be RS. 2,20,000". This case deals with several tentative alternative suggested during the meeting of the executive's committee that just reviewed the tentative profit plan.

You are required to compute :

- (a) The budgeted break-even point in rupees and the number of units that would have to be sold to earn the target profit;
- (b) You are also required to respond directly to each of the following two alternatives under consideration by the management. (Consider each independent of the other and state any assumptions that you would like to make).

Alternative (1) – A sales price increase of 20% is contemplated; the sales executive estimates that this will cause a drop in units that can be sold by 15%. What would be the new break-even point in rupees and in units. What would be the new profit figures? How many units would have to be sold to earn the target profit?

Alternative (2) – A decrease in fixed costs of Rs. 55,000 and a decrease in variable costs of 6% are contemplated. What would be new BEP in rupees? How many units must be sold to earn a target profit?

Question :3

ICWA Final, Dec.1998 and June 1999

The budgeted results of X Ltd. are as under:

Product	Sales value Rs.	P.V. Ratio %
X	2,50,000	50
Y	4,00,000	40
Z	6,00,000	30

Fixed overheads for the period are Rs. 5,02,200. The management is worried about the results.

You are required to prepare a statement showing the amount of loss if any, being incurred at present and recommend a change in the sales value of each product as well as in the total sales value maintaining the same sales mix, which will eliminate the said loss.

Question :4

Veejay Ltd. makes and sells two product, Vee and Jay. The budgeted selling price of Vee is Rs. 1,800 and that of Jay is Rs. 2,160. Variable costs associated with producing and selling Vee are Rs. 900 and that of Jay Rs. 1,800. The annual fixed production and selling costs of Veejay ltd. are Rs. 88,000.

The company has two production/sales options: that Vee and Jay can be sold either in the ratio of two Vees to three Jays or in the ratio of one Vee to two Jays.

What will be the optimal mix and why?

Chapter – 8

Key Factor & Optimal Product Mix

Question: - 1.

A company produces three products. The general Manager has prepared the following draft Budget for the next year.

	Products		
	A	B	C
Number of units	30,000	20,000	40,000
Selling price (Rs./unit)	40	80	20
P/v Ratio	20%	40%	10%
Raw material cost as percentage to sales value	40%	35%	45%
Maximum sales potential (units)	40,000	30,000	50,000

The company uses the same raw material in all the three products and the price per kg. of the raw material is Rs. 2.

The company envisages profit of 10% on the budgeted turnover before interest and depreciation which are fixed. Interest and depreciation are estimated at Rs. 3,00,000 and Rs. 10,00,000 respectively. The draft budget makes full utilization on the available raw material which is in short supply.

The managing Director is not satisfied with the budgeted profitability and hence he has passed on the aforesaid draft budget to you for review.

Required:

- (i) Set an optimal product mix for the next year and find its profit.
- (ii) The company has been able to locate a source for the purchase of an additional 20,000 kgs. Of raw materials at an enhanced price. The transport cost of this additional quantity of raw material is Rs. 10,000. What is the maximum price per kg. that can be offered by the company for the additional quantity of raw material .

Question: - 2.

(a) A firm produces 5 different products from a single raw material. Raw material is available in abundance at Rs. 6 per kg. The labour rate is Rs. 8 per hour for all products. The plant capacity is

21,000 labour hours for the budget period. Production facilities can produce the products. The factory overhead rate is Rs. 8 per hour, comprising Rs. 5.60 per hour fixed overhead and Rs. 2.40 per hour as variable overhead. The selling commission is 10% of the product price. Given the following information, you are to suggest a suitable sales mix which will maximize the company's profits. Determine the profit that will be earned at the selected sales mix.

Product	Market demand	Selling price	Labour hours	Raw material required
	(units)	Rs.	Per unit	Per unit (in gms.)
A	4,000	32.00	1.00	700
B	3,600	30.00	0.80	500
C	4,500	48.00	1.50	1,500
D	6,000	36.00	1.10	1,300
E	5,000	44.00	1.40	1,500

(b) Assume, in above situation 3,500 hours of overtime working is possible. It will result in additional fixed overheads of Rs. 20,000, a doubling of labour rates and a 50 per cent increase in variable overheads.

Do you recommend the overtime working?

Question: - 3.

A company has compiled the following data for preparation of budget for 1995:

		Products		
Sales per Month --- units		8,000	4,000	6,000
		Rs./Unit	Rs./Unit	Rs./Unit
Selling price		40	80	100
Direct Materials		20	48	40
Direct labour				
Dept.	Rate/Hour			
1.	Rs. 5.00	5	10	20
2.	4.00	8	4	12
Variable overheads		3	3	7
Fixed Overheads Rs. 1,50,000 per month				

After the Budget was discussed the following action plan was approved for improving the profitability of the company.

- Direct labour in department 1 which is in short supply should be increased by 15,000 hours by spending fixed overheads of Rs. 8,000 per month
- To boost sales, an advertisement programme should be launched at a cost of Rs. 10,000 per month.
- The selling price should be reduce by :
A: 2-1/2% B: 8-3/4% C: 1%
- The sales targets have been increased and the sales department has confirmed that the company will be able to achieve the following quantities of sales:
A: 12,000 units B: 6,000 units C: 10,000 units

Required:

- Present the original monthly budget for 1995.

- (ii) Set an optimal product mix after taking the action plan into consideration and determine its monthly profit.
- (iii) In case the requirement of direct labour hours of department 2 in excess of 40,000 hours is to be met by overtime working involving double the normal rate, what will be the effect of so working overtime on the optimum profit calculated by our in (ii) above.

Question: - 4.

From the following particulars, find the most profitable product mix and prepare a statement of profitability of that product mix:

	Product A	Product B	Product C
Units budgeted to be produced and sold	1,800	3,000	1,200
Selling price per unit Rs.	60	55	50
Requirement per unit:			
Direct Materials	5 Kg.	3 kg.	4 kg.
Direct Labour	4 hrs.	3 hrs.	2 hrs.
Variable overheads	Rs. 7	Rs. 13	Rs. 8
Fixed overheads	Rs. 10	Rs. 10	Rs. 10
Cost of Direct Materials per kg.	Rs. 4	Rs. 4	Rs. 4
Direct Labour Hour Rate	Rs. 2	Rs. 2	Rs. 2
Maximum possible Units of Sales	4,000	5,000	1,500

All the three products are produced from the same direct material using the same type of machines and labour. Direct labour, which is the key factor, is limited to 18,600 hours.

Question: - 5.

- (a) What is meant by Cost-plus pricing?
- (b) What is Responsibility Accounting?
- (c) What is the distinction between Cost Control and Cost Reduction?
- (d) (product-mix with two key factors). A company produces three products from an imported material. The cost structure per unit of the products is as under:

	Products		
	A	B	C
Sales value	Rs. 200	Rs. 300	Rs. 250
Direct Material	50	80	60
Direct Wages Rs. 6 per hour	60	120	108
Variable overheads	30	60	54

Out of direct material 80% is of the imported material @ Rs. 10 per kg.

Prepare a statement showing comparative profitability of the three products under the following scenarios:

- (i) Imported material is in restricted supply.
- (ii) Production capacity is limiting factor.

- (iii) When maximum sales potential of products A and B is 1,000 units each and that of product "C" is 500 units for specific requirement, availability of imported material is restricted to 10,000 kgs. Per month, how the profit could be maximized?

Question :- 6

BVX Limited manufactures three garden furniture products- chairs, benches and tables. The budgeted units cost and resource requirements of each of these items is detailed below:

	Chair	Bench	Table
Timber cost	Rs. 5.00	Rs. 15.00	Rs. 10.00
Direct labour cost	4.00	10.00	8.00
Variable overhead cost	3.00	7.50	6.00
Fixed overhead cost	4.50	11.25	9.00
	16.50	43.75	33.00
Budgeted volumes per annum	4,000	2,000	1,500

- These volumes are believed to equal the market demand for these products.
- The fixed overheads costs are attributed to the three products on the basis of direct labour hours.
- The labour rate is Rs. 4.00 pre hour.
- The cost of the timber is Rs. 2.00 per square metre.

The products are made from a special timber. A memo from the purchasing manager advises you that because of a problem with the supplier, it is to be assumed that this special timber is limited in supply to 20,000 square metres per annum.

The sales director has already accepted an order for 500 chairs, 100 benches and 150 tables which if not supplied would incur a financial penalty of Rs. 2,000. These quantities are included in the market demand estimates above.

The selling prices of the three products are ;

Chair	Rs. 20.00
Bench	Rs. 50.00
Table	Rs. 40.00

Requirement:

- Determine the optimum production plan and state the net profit that this should yield per annum.
- Calculate and explain the maximum prices which should be paid per square metre in order to obtain extra supplies of the timber.
- The management team has accused the accountant of using too much jargon.

Requirement:

Prepare a statement which explains the following terms in a way that a multi-disciplinary team of managers would understand. The accountant will use this statement as a briefing paper at the next management meeting. The terms to be explained are

- Variable costs;

- (ii) Avoidable costs;
- (iii) Opportunity costs;
- (iv) Relevant costs;
- (v) Incremental costs;

Question :- 7

A company produces two products AXE and BXE. The selling prices and cost data are as under:

Per units	AXE (Rs.)	BXE (Rs.)
Selling price	1,200	1,800
Direct materials	250	300
Direct wages @ Rs. 5 per hour:		
Department 1.	200	300
2.	100	200
3.	300	-
4.	-	400
Variable overheads	50	150

Fixed overheads per annum Rs. 12,50,000.

The company operates 250 days of work per annum of 8 hours per day. The number of employees in each department are:

Department 1.	300
2.	160
3.	180
4.	240

The employees cannot be increased nor can they be transferred from one department to another.

Required.

- (i) Calculate the number of units of each product that should be manufactured to yield maximum profit and compute the amount of such maximum profit.
- (ii) If the supply of direct materials is restricted to Rs. 15 lakhs per annum which product would you produce and in what quantity.

Explain the "learning curve" and its relevance to setting standards.

Question :- 8

TWM Ltd. earned a profit of 10% before interest and depreciation on its total sales in 19X1. Interest and depreciation, which are fixed, amounted to Rs. 150 lakhs. The sales and variable cost structure of the three products sold in 19X1 was as under:

	Products			(in lakhs)
	A	B	C	Total
Sales	200	600	400	1,200
Raw materials (Imported)	90	200	200	490
Direct labour	30	150	80	260
Variable overheads	20	100	60	180

While preparing the budget for the year 19X2, the company observed that the raw material prices will go up by 10% in 19X2 as compared to 19X1 prices. The company has, however, been able to secure an import license for import of raw materials of the value of Rs. 700.50 lakhs in 19X2. The company's marketing division has assured an increase of sales volume by 50% of the 19X1 sales volume in respect of each of the three products without any change in selling price.

Required:

- (i) Calculate the net profit/loss for 19X1
- (ii) Set optimal product mix for the year 19X2.
- (iii) What percentage of flat increase in selling price is required in 19X2 if the company wants to maintain the margin of safety at 10%.

Question: - 9.

An export oriented organization sells in the Middle East three brands of their products, viz, Juvenile, Adult and Aged. The market for different price segments is as follows:

Brand	Selling Price per 100 units	Market Demand units per month
Juvenile	Rs. 600	1,00,000
	550	1,20,000
	500	1,36,000
Adult	500	2,00,000
	475	2,20,000
	450	2,50,000
Aged	550	80,000
	525	96,000
	500	1,00,000

The capacity to pack and export is presently limited to 4 lakh units per month. The variable cost of production per unit is as follows:

	Juvenile	Adult	Aged
Raw material	Rs. 2.10	Rs. 1.50	Rs. 1.40
Packing material	1.60	1.00	1.00
Labour and expenses	0.62	0.58	0.57

Besides, trade discount is allowed @ 6% of selling price, out of which 1% is allowed to overseas agent. Variable distribution and handling charges amount to Rs. 12 per carton containing 50 units each. Export duty is payable 5% *ad valorem*.

Export incentives, viz, cash subsidy, duty drawback, etc. amount to 16% of net selling price after considering only 1% discount allowed to the Overseas Agency.

You are required to find out the combination of the three products, which will yield maximum profit, considering capacity constraints.

Question :- 10

Hitech Ltd, makes two products – Crown and Peak. Both the products use the same labour force, the size of which is restricted to 38,000 manufacturing and selling expenses etc. are as follows:

Production and sales	Crown		Peak	
Nos. per month	6,000	8,000	20,000	24,000
Costs per month (Rs.)	8,50,000	10,50,000	16,00,000	18,40,000

The company is considering pricing options in a highly competitive market. It has estimated sales demand at various selling prices as under.

Crown		Peak	
Selling price	Sales demand	Selling price	Sales demand
Per unit	Per month	Per unit	Per month
Rs.	Nos.	Rs.	Nos.
138	6,000	81.50	20,000
136	7,000	81.00	21,000
134	8,000	80.50	22,000
132	9,000	80.00	23,000
130	10,000	78.00	24,000
127	11,000	76.00	25,000

Required :

- What would be the profit maximizing selling price and monthly sales quantity for each product, if direct labour was available in unlimited supply?
- Given the restriction of 38,000 hours per month, what is the profit maximizing sales price and quantity for each product?

Question: - 11.

An engineering company is engaged in producing four product through operations at welding and pressing department. Products W1 and W2 are produced by welders in the welding department whereas products P1 and P2 are produced by press-operators in the pressing department. Due to specific skill requirements, the welders and press operators can only work in their own department.

	Products			
	W1	W2	P1	P2
Hours required per unit	4	4	5	2
Selling price per unit (Rs.)	48	50	77	69
Direct material cost per unit (Rs)	18	22	32	44
Direct labour hourly rate (Rs.)	4	4	4	4
Variable overhead rate per unit (Rs.)	2	2	3	3

The company incurs Rs. 50,000 per annum towards fixed costs. The maximum available hours are 20,000 and 16,000 for welding and pressing departments respectively.

The demands keep on fluctuating but the minimum demands which are to be met as per management's decision are 2,000 units of W1 2,500 units of W2 1,800 units of P1 and 2,200 units of P2.

The production manager suggests that the welders and press operators can be trained to perform both welding and pressing jobs so that excess demand of any of the products can be met. This decision is going to increase the burden of fixed costs by Rs. 5,000 per annum.

Prepare the profitability statement for optimum product-mix and recommend with reasons and appropriate working whether it is advisable to train the welders and press operators as suggested by the production manager.

Question: - 12.

S. U. Ltd. produces three products namely A, B, and C. the budgeted production, costs and selling prices for the next year are as under:

	A	B	C
Direct Materials (Rs./unit)	24	16	12
Direct Wages			
Dept. Rate/Hour			
1. Rs. 4 Hrs/unit	3	5	2.5
2. Rs. 2 Hrs/unit	3	8	6
Budgeted production (units)	10,000	12,000	20,000
Maximum possible sales (units)	12,000	16,000	24,000
Selling Price (Rs./unit)	75	105	60
Variable overheads			
1. Dept. 1 Recovered at 100% of Direct Wages			
2. Dept. 2 Recovered at 50% of Direct Wages			
3. Fixed overheads Rs. 5,00,000 per annum.			

Direct labour hours in Department I is in short supply and the budgeted volume of output envisages full utilization of the available direct labour hours. In Department 2, the company has committed to engage the workers to the extent of the direct labour hour required for the budgeted volume of production. Should a change in the product mix be desired, the company can engage additional direct labour hours required in Department 2 at normal rates. But any portion of the direct labour hours of Department 2 rendered surplus by reasons of a change in the present product mix will have to be paid by the company as idle time wages in view of the commitment already made.

Required:

- Present a statement showing the budgeted profitability.
- Set optimal product mix and work out the optimum profit after taking into consideration the idle time wages, if any, payable in Department 2.
- If the company desires to sub-contract the surplus direct labour hours, if any, in Department 2, what minimum charge should be quoted per direct labour hour.

Question :- 13.

A company produces four products A, B, C, and D which are marketed in cartons. Of the total of 20 machines installed, 8 are suitable for manufacturing all the four products and the remaining 12 machines are not suitable for the manufacture of products A and D.

Each machine is in production for 300 days a year and each is used on a given product in terms of full days and not in fractions of days. The company, however, has no problem in obtaining adequate supplies of labour and raw materials.

The marketing policy is that all four products should be sold and the minimum Annual production should be 3000 cartons for each product. Fixed cost budgeted amount to Rs. 50 lacs. Production cost and price data are as under:-

	A	B	C	D
Production/day/machine (cartons)	14	4	3	6
Selling Price/Carton	Rs. 810	Rs. 790	Rs. 845	Rs. 1290
Cost: Process I				
Direct Material/day/Machine	140	52	45	84
Direct Labour/day/machine	224	148	90	132
Process II				
Direct Material/Carton	30	30	30	30
Direct Labour/carton	240	216	300	360
Variable overheads/Carton	390	390	300	720

With a view to meeting the increasing demand for products A and D the company is contemplating to convert such number of machines as may be necessary out of the 12 machines which at present are unsuitable to produce products A and D into all – purpose machines. The cost of conversion of these machines is Rs. 2,10,000 per machine. The expenditure is to be amortized over a period of three years. The company expects 12.5% return on this expenditure.

Market research indicates that the company's sales of Products A and D can be increased to 37,500 cartons and 5,400 cartons respectively.

Required:

- Calculate the optimum profit of the company if the existing machines were worked on most profitable basis before conversion.
- Recommend the maximum number of machines to be converted into all-purpose machines giving supporting calculations.
- Calculate for the first year the optimum profit of the company after conversion of the required number of machines into all purpose machines.

Question :- 14.

V. Ltd. Produces two products P and Q. the draft budget for the next month is as under:-

	P	Q
Budgeted production and sale (unit)	40,000	80,000
Selling Price Rs./unit	25	50
Total Costs Rs./unit	20	40
Machine Hours/unit	2	1
Maximum sales potential (units)	60,000	1,00,000

The fixed expenses are estimated at Rs. 9,60,000 per month. The company absorbs fixed overheads on the basis of machine hours which are fully utilized by the budgeted production and cannot be further increased.

When he budget was discussed, the managing director stated that the product mix should be altered to yield optimum profit.

The marketing director suggested that he could introduce a new Product C , each unit of which takes 1.5 machine hours. However, a processing vat involving a capital outlay of Rs. 2,00,000 is to be installed for processing product "C". the additional fixed overheads relating to the

processing vat was estimated at Rs. 60,000 per month. The variable cost of product C was estimated at Rs. 21 per unit.

Required:

- (i) Calculate the profit as per draft budget for the next month.
- (ii) Revise the product mix based on data given "P" or "Q" to yield optimum profit.
- (iii) The company decides to discontinue either product "P" or "Q" whichever is giving lower profit and proposes to substitute Product "C" instead. Fix the selling price of Product "C" in such a way as to yield 15% return on additional capital employed besides maintaining the same overall profit as envisaged in (ii) above.

Question :- 15

A company engaged in plantation activities, has 200 hectares of virgin land which can be used for growing jointly or individually tea, coffee and cardamom. The yield per hectare of the different crops and their selling price per kg are as under:

	Yield	Selling price per kg.
Tea	2,000 kg	Rs. 20
Coffee	500	40
Cardamom	100	250

The relevant cost data are given below:-

(a) Variable cost per kg.

	Tea	Coffee	Cardamom
Labour charges	Rs. 8	Rs. 10	Rs. 120
Packing materials	2	2	10
Other costs	4	1	20
Total cost	14	13	150

(b) Fixed cost per annum

Cultivation and growing cost	Rs. 10,00,000
Administration cost	2,00,000
Land revenue	50,000
Repair and maintenance	2,50,000
Other costs	3,00,000
Total fixed costs	18,00,000

The policy of the company is to produce and sell all the three kinds of products and the maximum and minimum area to be cultivated per product is as follows:

	Maximum	Minimum
Tea	160 hectares	120 hectares
Coffee	50	30
Cardamom	30	10

Calculate the most profitable product-mix and the maximum profit which can be achieved.

Question: - 16.

An agriculturist has 180 hectares of land on which he grows potatoes, tomatoes, peas and carrots. Out of the total area of land, 340 hectares are suitable for all the four vegetables but the remaining 140 hectares of land are suitable only for growing peas and carrots. Labour for all kinds of farm work is available in plenty.

The market requirement is that all the four types of vegetables must be produced with a minimum of 5,000 boxes of any one variety. The farmer has decided that the area devoted to any crop should be in terms of complete hectares and not in fractions of a hectare. The only other limitation is that not more than 1, 13,750 boxes of any one vegetable should be produces.

The relevant data concerning production, market prices and costs are as under:-

	Potatoes	Peas	Carrots	Tomatoes
Annual yield:				
Boxes per hectare	350	100	70	180
Costs:				
Direct material per hectare	Rs. 952	Rs. 432	Rs. 384	Rs. 624
Direct labour:				
Growing per hectare	1792	1216	744	1056
Harvesting and packing per box	7.20	6.56	8.80	10.40
Transport per box	10.40	10.40	8.00	19.20
Market price per box	30.76	31.74	36.80	44.55
Fixed expenses per annum:				
Growing	Rs. 1,24,000			
Harvesting	Rs. 75,000			
Transport	Rs. 75,000			
General administration	Rs. 1,50,000			

It is possible to make the land presently suitable for peas and carrots, viable for growing potatoes and tomatoes if certain land development work is undertaken. This work will involve a capital expenditure of Rs. 6,000 per hectare which a bank is prepared to finance at the rate of interest of 15% p.a. if such improvement is undertaken, the harvesting cost of the entire crop of tomatoes will decrease on an average by Rs. 2.60 per box.

Required:-

- Calculate, within the given constraints, the area to be cultivated in respect of each crop to achieve the largest total profit and the amount of such total profit before land development work is undertaken.
- Assuming that the other constraint continues, advise the grower whether the land development scheme should be undertaken and if so the maximum total profit that would be achieved after the said development scheme is undertaken.

Question :- 17.

A company has prepared the following flexible budget for a period:

	Capacity		
	80%	100%	120%
	Rs.	Rs.	Rs.
Variable costs:			
Direct materials	5,00,000	6,25,000	7,50,000
Direct wages	6,00,000	7,50,000	9,00,000
Factory overheads	3,00,000	3,75,000	4,50,000
Selling overheads	3,00,000	3,75,000	4,50,000
Total	<u>17,00,000</u>	<u>21,25,000</u>	<u>25,50,000</u>
Fixed costs:			
Factory overheads	8,00,000	8,00,000	15,00,000
Administration overheads	3,00,000	3,00,000	4,00,000
Selling overheads	<u>2,00,000</u>	<u>2,00,000</u>	<u>6,00,000</u>
Total	<u>13,00,000</u>	<u>13,00,000</u>	<u>25,00,000</u>
Grand total	<u>30,00,000</u>	<u>34,25,000</u>	<u>50,50,000</u>

The total direct labour hours at 100% capacity is 3,00,000. The company's policy is to add a mark up of 20% on variable costs for profit. During the period, the company intends to produce product 'A'. The unit variable cost data relating to product 'A' are as under:

Direct Materials	Rs. 30	Direct Wages	Rs. 60
Factory Overheads	Rs. 30	selling Overheads	Rs. 30

Direct labour hours per unit 8.

You are required to calculate for product 'A' the selling price to be charged at each level of capacity if

- There is no limiting factor
- Direct material is in short supply
- Direct labour hours is in short supply.

Answer:	Capacity		
	80%	100%	120%
Selling Price			
a	223.34	214.66	235.55
b	258.00	242.40	279.90
c	223.36	214.64	235.52

Question: - 18.

Sellaway Ltd. manufactures and markets 2 products A and B, the demand in the market of which fluctuates with the prices quoted. As a result of the deliberations of its recent Sales Conference the following data was agreed upon as a working basis:

Product	A			B		
Selling price/unit Rs.	32	30	28	22	20	18
Expected demand p.m. nos.	900	1000	1500	1600	2000	3000

8 labour hours are required to produce product A and 4 labour hours to produce product B and the maximum capacity of the factory is restricted to 20,000 labour hours per month.

The cost structure is s under per unit of production:

	Rs.	Rs.
	A	B
Direct material	4	3
Direct labour	6	5
Variable overheads	<u>10</u>	<u>6</u>
	<u>20</u>	<u>14</u>

Fixed overheads are Rs. 32,400 per quarter.

You are required to compute the possible combinations and arrive at a proper price mix for maximum profitability.

Also work out the profitable price-mix in case the spare capacity can be fully utilised to meet additional demand of the products A and B in the ratio 3 : 2.

Answer: Maximum contribution of Rs. 24,800 is possible at 18,400 labour hours.
Profitable price mix is A – Rs. 28 & B – Rs. 22.

Question: - 19.

As a part of its rural upliftment programme, the Government has put cultivation a farm of 96 hectares to grow tomatoes of four varieties: Royal Red, Golden Yellow, Juicy Crimson and Sunny Scarlet. Of the total, 68 hectares are suitable for all four varieties, but the remaining 28 hectares are suitable for rowing only Golden Yellow and Juicy Crimson. Labour is available for all kinds of form work and is no constraint.

The market requirement is that all four varieties of tomatoes must be produced with a minimum of 1,000 boxes of any one variety.

The farmers engaged have decided that the area devoted to any crop should be in terms of complete hectares and not in fractions of a hectares. The other limitation is that not more that 22,750 boxes of any on e variety should be produced. The following data relevant:-

	Royal Red	Golden Yellow	Juicy Crimson	Sunny Scarlet
Annual Yields Boxes per hectare	350	100	70	180
Costs	Rs.	Rs.	Rs.	Rs.
Direct:				
Materials per hectare	476	216	196	312
Labour:				
Growing per hectare	896	608	371	528
Harvesting and packing per box	3.60	3.28	4.40	5.20
Transport per box	5.20	5.20	4.00	9.60
Market price per box	15.38	15.87	18.38	22.27
Fixed overheads per annum:			Rs.	
Growing			11,200	
Harvesting			7,400	
Transport			7,200	
General administration			10,200	

Find out:-

- Within the given constraints, the area to be cultivated with each variety of tomatoes, if the largest total profit has to be achieved.
- The amount of such profit in rupees.

A nationalized bank has come forward to help in the improvement programme of the 28 hectares in which only Golden Yellow and Juicy Crimson will grow, with a loan of Rs. 5,000 at a very nominal interest of 6% per annum. When this improvement is carried out, there will be a

saving of Rs. 1.25 per box in the harvesting cost of Golden yellow and the 28 hectares will become suitable for growing Royal Red in addition to the existing Golden Yellow and Juicy Crimson varieties. Assuming that other constraints continue, find the maximum total profit that would be achieved when the improvement programme is carried out.

Answer: Total profit Rs. 26,264.80.

Question: - 20.

SV Ltd., engaged in the manufacture of four products has prepared the following budget for 1989:-

	A	B	C	D
Production units	20,000	5,000	25,000	15,000
Selling price Rs./unit	21.75	36.75	44.25	64.00
Direct materials Rs./unit	6.00	13.50	10.50	24.00
Direct wages Rs./unit	7.50	10.00	18.00	24.00
Variable overheads Rs./unit	2.25	5.00	6.00	6.50
Fixed overheads Rs. per annum	75,000	25,000	2,25,000	1,80,000

When the budget was discussed, it was proposed that the production should be increase by 10,000 units for which capacity existed in 1989.

It was also decided that for the next year i.e. 1990, the production capacity should be further increased by 25,000 units over and above the increase of 10,000 units envisaged as above for 1989. The additional production capacity of 25,000 units should be used for manufacture of product B for which new production facilities were to be created at an annual fixed overhead cost of Rs. 35,000. The direct material costs of all the four products were expected to increase by 10% in 1990 while the other costs and selling prices would remain the same.

Required:

- Find the profit of 1989 on the assumption that the existing capacity of 10,000 units is utilised to maximise the profit.
- Prepare a statement of profit for 1990.
- Assuming that the increase in the output of product 'B' may not fully materialize in the year 1990, find the number of units of Product B to be sold in 1990 to earn the same overall profit as in 1989.

Answer: (a) Total Profit Rs. 1,40,000; (b) Total Profit Rs. 1,86,000; (c) 23,333 units.

Question: - 21.

Universe Ltd. Manufactures two products X and Y. It is facing severe competition in the market. The monthly sales potential in units at different selling prices as anticipated by the sales manager are as under:-

Product – X		Product - Y	
Selling Price Per unit	Sales Potential (in units)	Selling Price Per unit	Sales Potential (in units)
Rs.		Rs.	
110	5,000	78	30,000
108	7,500	77	32,000
107	8,000	75	35,000
103	8,400	72	40,000
096	9,000	69	45,000

The total costs as disclosed by the budgets of the company are as follows:

	Product –X		Product - Y	
Output and sales per month (units)	5,000	9,000	30,000	45,000
Total costs per month (Rs. In lacs)	5	6.6	18	25.5
Labour hours needed per month	20,000	36,000	60,000	90,000

You are required to find out the selling price and units to be sold to earn maximum profit where (a) labour hours are available without any restriction and (b) only 95,000 hours are available.

Answer:- units to be sold of product X – 8,000 and of product Y – 40,000 and selling price unit Rs. 107 and Rs. 72 respectively; (b) profit Rs. 7,94,000.

Question :- 22

GG Ltd. manufactures and sells an equipment called water purifier. The cost data for each batch of ten numbers of water purifier is as follows:

Components	A	B	C	D	E
Machine Hours	20	28	24	-	-
Labour Hours	--	--	--	4	2
	Rs.	Rs.	Rs.	Rs.	Rs.
Variable costs	64	108	116	24	8
Fixed costs as apportioned	36	52	64	26	22

Assembly costs (all variable) Rs. 50 per batch.
Selling price Rs. 800 per batch.

Maximum available machine capacity for making components A, B and C is 10,800 hours and it cannot be increased further. Labour is available for making components D and E and for assembling the product. .

Estimated increase in demand next year is 50% and fixed costs in general may increase by Rs. 10,000.

In order to release production capacity to meet increased market demand, the company decided to purchase one of the machine made components.

Quote Ltd. is the only supplier of components A, B and C. Because of incomplete records, it is unable to quote single figure prices. Its quotation is as follows:

Component	Pessi- mistic view	Probability	Most Likely view	Probability	Optimistic view	Probability
	Rs.		Rs.			
A	120	0.25	110	0.5	80	0.25
B	200	0.25	130	0.5	140	0.25
C	160	0.25	140	0.5	120	0.25

It is agreed between the companies that the price of each of the components will be determined on a overall basis based on information found in the quotation.

You are required :-

- (i) Indicate, in the context of key factor, the maximum number of batches that could be produced, if each of the three alternatives namely buying A or B or C is considered.
- (ii) Analyse the financial implication of purchase and advise which component is to be bought keeping in view the fact the production capacity will be limited to a 50% increase.
- (iii) Prepare a Profit Statement for the period assuming that the component chosen by you is bought out and extra production is made and sold.

Answer:-

Purchased from Outside

A B C

- (i) No. of batches produced internally (in batches) 207.69 245.45 225
- (ii) Component C should be purchased from outside as it gives maximum contribution of Rs. 91,350
- (iii) Profit and manufacturing of 225 batches Rs. 51,350

Home Work

Question -1

CA Inter, May 1998

Taurus Ltd. produces three products – A,B, and C, form the same manufacturing facilities. The cost and other details of the three products are as follows:

	A	B	C	
Selling price/unit (Rs.)	200	160	100	
Variable cost/unit (Rs.)	120	120	40	
Fixed expenses/month (units)				2,76,000
Maximum production per month (units)	5,000	8,000	6,000	
Total horus available for the month				200 hours
Maximum demand per month (units)	2,000	4,000	2,400	

The processing hours cannot be increased beyond 200 hours per month

You are required to:

- Compute the most profitable product mix;
- Compute the overall break-even sales of the company for the month based on the mix calculated in (a) above.

Question -2

CA Final, Nov. 1978; ICWA Final Dec. 1983

The directors of ABC Ltd. manufactures of products A, B and C, have asked for advice on the product mix of the company. The following information is given:

Products	A	B	C
Standard cost per unit:			
Direct Material	Rs. 20	Rs. 60	Rs. 40
Variable overhead	6	4	10
Direct labour:			
Department	Rate/Hr.	Hrs.	Hrs.
1	Rs.1	28	16
2	Rs. 2	5	6
3	Rs. 1	16	8
Current production per annum (units)	10,000	5,000	6,000
Selling price per unit	Rs. 100	Rs. 136	Rs. 180
Forecast of sales for the next year	12,000	7,000	9,000
Fixed overhead per annum Rs. 4,00,000			

Further, the type of labour required by Department 2 in short supply and it is not possible to increase the manpower of this department beyond its present level.

You are required to prepare a statement showing the most profitable mix of the products to be made and sold. The statement which should be presented in tow parts should show:

- The profit expected on the current budgeted production, and
- The profit which could be expected if the most profitable mix was produced.

Question -3

CIMA London, Nov. 1991

Three products X, Y and Z are made and sold by a company; information is given below:

	Product X	Product Y	Product Z
Standard Costs:			
Direct materials	Rs. 50	Rs. 120	Rs. 90
Variable overheads	12	7	16

Direct labour:	Rate per hour	Hours	Hours	Hours
Department A	Rs. 5	14	8	15
Department B	6	4	3	5
Department C	4	8	4	15

The fixed overhead for the year was budgeted at Rs. 3,00,000.

The budget for the current financial year, which was prepared for a recessionary period, was based on the following sales:

Product	Sales in units	Selling price per units
X	7,500	Rs. 210
Y	6,000	220
Z	6,000	300

However, the market for each of the products has improved and the Sales Director believes that without a change in selling price, the number of units sold could be increased for each product by the following percentages:

Product	Increase
X	20%
Y	25%
Z	33-1/3%

When the Sales Director's views were presented to a management meeting, the Production Director declared that although it might be possible to sell more units of products, output could not be expanded because he was unable to recruit more staff for Department B: there being a severe shortage of the skills needed by this Department.

You are required:

- to show in the form of a statement for management, the unit cost of each of the three products and the total profit expected for the current year based on the original sales figures;
- To state the profit if the most profitable mixture of the products was made and sold, utilizing the higher sales figures and the limitation on Department B:
- To identify and to comment on three possible problems which may arise if the mixture in (a) (ii) above were to be produced.

Question -4

ICWA Final, June 1990

A manufacturer has three products A, B and C. current sales, cost and selling price details and processing time requirements are as follows:

	Product A	Product B	Product C
Annual Sales (Units)	6,000	6,000	750
Selling price (Rs.)	20	31	39
Units cost (Rs.)	18	24	30
Processing time required per unit (hours)	1	1	2

The firm is working at full capacity (13,500 processing hours per year), fixed manufacturing overheads are absorbed into unit costs by a charge of 200% of variable costs. This procedure fully absorbs the fixed manufacturing overheads. Assuming that:

- Processing time can be switched from one product line to another.
- The demand at current selling price is:

Product A	Product B	Product C
11,000	8,000	2,000

- The selling prices are not to be altered. **You are required** to calculate the best production programme for the next operating period and to indicate the increase in net profit that it should yield. In addition identify the shadow price of processing hour.

Question -5**ICWA Final, June 1997**

A company produces four products, viz, P, Q, R and S. The operations are carried out with two types of machines Ax and By. Products P and Q are manufactured on machine Ax and R and S on machine By. P and Q cannot run on machine By and R and S cannot run on machine Ax. A minimum of 1000 units each of P and Q and 1200 units each of R and S should be manufactured by the company to maintain its customer relations.

The total capacity of Ax is 9000 hours and By is 10,500 hours for the period. The selling price and cost data are as under:

	P	Q	R	S
Selling price per unit	Rs. 400	Rs. 500	Rs. 600	Rs. 512
Direct material per unit	112	140	224	124
Direct wages per machine hour	60	40	72	100
Variable overheads per units				
@ Rs. 24 per machine hour	72	90	66	54
Fixed overheads Rs. 6,00,000 for the period				

The company intends to convert both the machine Ax and By into a versatile center to enable any of the four products to be manufactured on either of the two machines. The cost of such conversion will entail a fixed overhead increase of Rs. 30,000 for the period.

You are required to set optimal product mix before and after conversion of both the machine into a versatile centre and calculate the respective optimal profit.

Question -6**CA Final, Nov. 1987**

Novelties Ltd. seeks your advice on production mix in respect of the three products Super, Bright and Fine. You have the following information:

Data for Standard Costs per unit:

	Super	Bright	Fine
Direct materials	Rs. 320	Rs. 240	Rs. 160
Variable overhead	16	40	24
Direct Labour:			
Department	Rate per Hour	Hours	Hours
A	Rs. 8.00	6	10
B	16.00	6	15

From current budget, you have further details as below:

	Super	Bright	Fine
Annual production (Nos.)	5,000	6,000	10,000
Selling price per unit (Rs.)	624	800	480
Fixed overhead: Rs. 16,00,000			
Sales department's estimate of maxi. Possible Sales in the coming year (Nos.)	6,000	8,000	12,000

You are also to note that there is a constraint on supply of labour in Department A and its manpower cannot be increased beyond its present level.

Suggest the best production and sales mix from the standpoint of maximum profitability.

Prepare statements setting out the profits resulting from the budgeted production and the best alternative suggested by you.

Question -7**ICWA Final, Dec. 1988**

A company manufactures four products. The cost data per unit are as under:

	A	B	C	D
Selling price	Rs. 90	71	100	86
Direct material	30	20	40	40
Direct labour	24	18	30	12
Variable overheads	12	9	15	6

The fixed costs are estimated at Rs. 2,00,000 per month. The company employs 250 direct workers, who work eight hours a day for 25 days a month. The direct wage rate is Rs. 6 per hour. It is not possible for the company to increase its operation in the short run nor it is practicable to work overtime. The company's policy does not allow sub-contracting of work.

The marketing Directors has forecast the following demand for a month:

Product	Units	Product	Units
A	5,500	C	6,250
B	5,000	D	8,250

The management desires you to revise the product mix in the following manner:

- To yield the maximum profit for the month.
- In proportion to the quantities forecast by the Marketing Director.
- In proportion to the labour requirements calculated for the forecast of sales of the marketing Director.

Present statements showing the sales, costs and profits in respect of each of the aforesaid product mix.

Question -8

CA Final, May 1983

Something More Ltd. is considering adding to its product line. After a lot of deliberations between the Sales and Production personnel, it is decided that products P, Q and R would be the most desirable additions to the company's product range on account of the technical competency, marketing potential and production flexibility as regards these products. In fact P, Q and R can all be made on the same kind of plant as that already in use and therefore as regards production, all products can be readily interchanged. However, it is considered necessary to build further plant facilities to cater for additional production.

In this connection the following data are relevant:

Products (per unit)	P	Q	R
Direct materials	Rs. 100	Rs. 120	Rs. 90
Direct labour	50	70	90
Variable overheads	50	130	100
Selling price	350	420	370
Demand in units per cost period (on the basis of the above selling price)	200	125	750
Machine hours required per unit of production	15	5	3

It is felt that initially extra plant facilities can be build to operate at the following five different levels of activity, viz, 1,800, 2,300, 2,800, 3,300 and 3,800 machine hours per cost period. The fixed overhead costs for a cost period relevant to these five different levels of activity are estimated at Rs. 15,000, Rs. 20,000, Rs. 26,000, Rs. 33,000 and Rs. 39,000 respectively.

You are required advise, with supporting figures, the product or products to be manufactured and in what quantities at each of the five contemplated levels of activity in order to maximize the profits at each level and also indicate the level of activity that would seem most desirable to be pursued for such maximization of profits.

Question :9

May 1997

The relevant data of X Ltd for its three products A, B and C are as under:

	A	B	C
Direct material (Rs./Unit)	260	300	250
Direct labour (Rs./Unit)	130	270	260
Variable overheads (Rs./Unit)	110	230	180
Selling price (Rs./Unit)	860	1,040	930
Machine hours required (Per Unit)	12	6	3

The estimated fixed overheads at four different levels of 3,600; 6,000; 8,400 and 10,800 machine hours are Rs. 1,00,000; Rs. 1,50,000; Rs. 2,20,000 and Rs. 3,00,000 respectively. The maximum demand of A, B and C in a cost period are 500; 300 and 1,800 units respectively.

You are required to find out (i) the most profitable product-mix at each level and (ii) the level of activity where the profit would be maximum.

Answer: (i)	3,600	6,000	8,400	10,800
A	-	-	100	300
B	-	100	300	300
C	1,200	1,800	1,800	1,800
(ii) 8,400 machine hour level.				

Question: 10

May 1985

On a turnover of Rs. 20 crores in 1984, a large manufacturing company earned a profit of 10% before interest and depreciation which were fixed. The product mix of the company was as under:-

Products	Mix % to total sales	PV ratio %	Raw material as % on sales value
P	10	30	40
Q	20	20	35
R	30	40	50
S	40	10	60

Interest and depreciation amounted to Rs. 150 lacs and Rs. 77 lacs respectively.

Due to fluctuation in prices in the International market, the company anticipates that the cost of raw materials which are importee will increase by 10% during 1985. The company has been able to secure a licence for the import of raw materials of a value of Rs. 1,023 lacs at 1985 price. In order to counteract the increase in costs of raw materials the company is contemplating to revise its product mix. The market survey report recently prepared indicates that the sales potential of each of the products 'P', 'Q' and 'R' can be increased upto 30% of total sales value of 1984. There is no inventory goods work-in-process in both the years.

Required:

- Set an optimal product mix for 1985 and find the profitability.
- What percentage increase in overall price is required in 1985 to raise the sales value to maintain the margin of safety at 10%.

Question :11

May 1992

(a) A firm produces 5 different products from a single raw material. Raw material is available in abundance at Rs. 6 per kg. the labour rate is Rs. 8 per hour for all products. The plant capacity is 21,000 labour hours for the budget period. Production facilities can produce all the products. The factory overheads rate is Rs. 8 per hour, comprising Rs. 5.60 per hour as fixed overhead and Rs. 2.40 per hour as variable overhead. The selling commission is 10 percent of the product price. Given the following information, you are to suggest a suitable sales mix which will maximise the company's profits. Determine the profit that will be earned at the selected sales mix.

Product	Market demands (Units)	Selling price (Rs.)	Labour Hours required per unit	Raw material required per unit (in gms.)
A	4,000	32.00	1.00	700
B	3,600	30.00	0.80	500
C	4,500	48.00	1.50	1,500
D	6,000	36.00	1.10	1,300
E	5,000	44.00	1.40	1,500

(b) Assume in above situation, 3,500 hours of overtime working is possible. It will result in additional fixed overheads of Rs. 20,000, a doubling of labour rates and a 50 percent increase in variable overheads. Do you recommend the overtime working?

**Answer: (a) A – 4,000, B – 3,600, C – 4,500, D – 6,000, E – 550 units;
(b) reduction in profit by Rs. 12,100.**

Question :12

Nov. 1992

Agrocaps Ltd., engaged in manufacturing agricultural machinery, is preparing its annual budget for the coming year. The company has a metal pressing capacity of 20,000 hours, which will be insufficient for manufacture of all requirements of components of A, B, C and D.

The company has the following choices:-

- (1) Buy the components entirely from outside suppliers.
- (2) Buy from outside suppliers and/or use a partial second shift.

The data for the current year are given below:-

Components	Standard production cost per unit.			
	A Rs.	B Rs.	C Rs.	D Rs.
Variable Cost:				
Direct materials	37	27	25	44
Direct wages	10	8	22	40
Direct expenses	10	20	10	60
Fixed overhead	5	4	11	20
Total production cost	62	59	68	164
Requirements in units	2,000	3,500	1,500	2,800

Direct expenses relate to the metal presses which cost Rs. 10 per hour, to operate. Fixed overheads are absorbed as a percentage of direct wages.

Supply of all any part of the total requirement can be obtained following prices, each delivered to the factory:-

Component	Rs.
A	60
B	59
C	52
D	168

Second shift operation would increase direct wages by 25 percent over the normal shift and fixed overhead by Rs. 500 for each 1,000 (or part thereof) second shift hours worked.

You are required to present, with calculation:-

- (a) Which component, and in what quantities should be manufactured in the 20,000 hours of press time available?
- (b) Whether it would be profitable to make any of the balance of components required on a second shift basis instead of buying them from outside suppliers.

**Answer: (a) Component D and A and only 600 units of B can be manufactured.
Components B i.e., 2900 units will have to be brought out in the second shift.
(b) It is profitable to make 2900 units on a second shift basis instead of buying from outside.**

Chapter – 9

Sub Contracting Decision

Question: 1

The opportunities afforded by the European Union have created a pleasant problem for CD Limited, which is considering concentrating its production on one of two products – "Robroy" or "Tigger" – both of which are currently made and sold. With the expansion in sales possible, either product can be sold in quantities which exceed the capacity of the present production facilities. Therefore, the use of the sub-contractor is being considered.

Sub-contractor Jason can produce up to a maximum of 10,000 units of Robroy or 8,000 unit of Trigger in a year for the type of work done by Department I. Jason's prices would be Rs. 120 for Robroy and Rs. 154 for Trigger, both prices being inclusive of the raw materials.

A market research study has shown that for more than 22,000 units, of Robroy to be sold in a year, the price of the total quantity sold would need to be reduced to Rs. 270 each. If more than 18,000 units of Tigger are to be sold in a year, the price of the total quantity sold would need to be reduced to Rs. 390 each.

CD Limited has started that its standard selling prices and standard prime costs for each product for the forth coming year are :

Trigger	Robroy			
	Hours	Rs.	Hours	Rs.
Sales price :		300		430
Costs- Department 1 :				
Direct material		45		75
Direct wages	5	40	7.5	60
Costs - Department 2:				
Direct material		15		20
Direct wages	7.5	75	10	100

Production overhead are to be absorbed on a direct labour hour basis and the budgeted overheads for the forthcoming year are :

	Department I	Department II
Fixed overhead	Rs. 4,00,000	Rs. 8,00,000
Variable cost per direct labour hour	Rs. 2.00	Rs., 2.40
Budgeted maximum labour hours available	1,00,000	1,60,000

You are required (a) to state, with supporting calculations and estimated profit figures, whether CD Limited should concentrate its resources on Robroy or Trigger if:

- (i) It does not use sub-contractor;
- (ii) It does use sub-contractor and restricts its sales to either 22,000 units of Robroy or 18,000 unit of Trigger;

(b) to describe briefly one possible problem arising for each of the following situations:

- (i) If your conclusion in (a) (i) above is followed,
- (ii) If your conclusion in (a) (ii) above is followed.

Question: 2

Fancy Furnishers Ltd. manufactures one type of sofa set exclusively. The set contains the following seven components:

One sofa, two centre tables and four chairs.

These components can be either manufactured by the company or sub-contracted and the following are the relevant data.

	Sofa	Table	Chair
Direct material cost per component (Rs.)	1,000	500	550
Direct labour hours per component	100	50	10
Sub-contract price per component (Rs.)	2,500	1,000	750

Sales of sofa sets are currently 8,000 per period, each set selling per Rs. 7,500. A capacity constraint of 5,00,000 direct labour hours obliges the company to sub-contract some components.

The variable overheads vary with direct labour hours worked and are incurred at rate of Rs. 2 per hour. Fixed costs are Rs. 17,50,000 period and labour costs Rs. 5.50 per hour,

Advice:

- Which components and how many should be manufactured by the company.
- What is the maximum profit that could be earned at current sales, if sales were unlimited.
- If the selling price has to be reduced to Rs. 6,950 per sofa set, what is the maximum profit that the company can obtain?

Question: 3

HAZY Ltd, manufacturers for products – P, Q, R and S. The direct cost productions are estimated at:

	P	Q	R	S
Material	Rs. 36	Rs. 38	Rs. 42	Rs. 24
Labour :				
Assembly (at Rs. 4 per hour)	8	12	16	16
Machinists (at Rs. 6 per hour)	12	24	18	26

Total fixed cost are dependent on output levels, as follows:

Production (units)	Total fixed costs
Up to 50,000	Rs. 4,00,000
50,001 to 75,000	5,00,000
75,001 to 1,00,000	6,00,000

The sales Directors estimates that demand for their products in the next year will be as follows:

	P	Q	R	S
Units	18,000	30,000	27,000	15,000
Selling price/units (Rs.)	68	90	91	94

The production manager states that the capacity of existing machines is 2,10,000 hours per annum., though this will be increased to 3,00,000 hours in two year's time when new plant which is

currently on order will be delivered. Meanwhile, a local firm has offered to manufacture any of the products on a sub-contract basis at the following prices :

P	Rs. 63	R	Rs. 72
Q	Rs. 80	S	Rs. 82

Required:

- Advice the management to what extent the services of the sub-contractor should be utilized in order to meet the expected demand of P,Q,R, and S
- Prepare a statement showing the profit you would expect if you advise is followed.
- Discuss briefly the reasoning you have applied in making your recommendation.

Question: 4

Motor components Ltd. have secured an order for 3,000 components per week from a car manufacturer but there is a shortage of available skilled labour capacity which is restraining the company from producing the entire quantity within the company.

Production, cost and sales information of Motor Component Ltd. are as under

Sales price of complete component	Rs. 1,500
Skilled labour capacity per week	7,500 hours
Production labour rate per hour	Rs. 120
Variable production overhead	50% of labour cost
Fixed overhead cost	Rs. 5,00,000 per week
Testing cost for complete component	Rs. 20

Each component is finally assembled from three section, made up of one or more parts as under:

	I	II	III
Part per section	5	4	1
Material cost per part	Rs. 60	Rs. 40	Rs. 20
Production labor minutes per part	18 mins.	15 mins.	30 mins.
The subcontract price for component Of Rs. 1,400 made up as indicated	Rs. 700	Rs. 500	Rs. 200

The two production strategies available are :

- To produce as many completed components as possible within the existing weekly skilled labour capacity and subcontract the remaining complete components, and
- Produce as many of the three section of the components as possible and subcontract the company .

You are to advise which of the above two production strategies would be more profitable for the company.

Question: 5

Modern packaging Corporation specialized in the manufacture of one-liter plastic bottles. The firm's customers include dairy processors, fruit juice manufactures and manufactures of edible oil. The bottles are produced by a process called blow moulding. A machine heats plastic to the melting point. A bubble of molten plastic is formed inside a mould, and a jet of hot air is forced into the bubble. This blows the plastic into the shape of the mould. The machine releases the moulded bottle, an employee trims off any flashing (excess plastic around the edge), and the bottle is complete.

The firm has four moulding machines, each capable of producing 100 bottles per hour. The firm estimates that the variable cost of producing a plastic bottle is 20 paise. The bottles are sold for 50 paise each.

Management has been approached by a local toy company that would like the firm to produce a moulded plastic toy for them. The toy company is willing to pay Rs. 3.00 per unit for the toy. The variable cost to manufacture the toy will be Rs. 2.40. In addition, Modern packing corporation would have to incur a cost of Rs. 20,000 to contract the needed mould exclusively for this order. Because the toy uses more plastic and is of a more intricate shape than a bottle, a moulding machine can produce only 40 units per hour. The customer wants 1,00,000 units. Assume that Modern Packing Corporation has the total capacity of 10,000 machine hours available during the period in which the toy company wants the delivery of toys. The firm's fixed costs, excluding the costs to construct the toy mould, during the same period will be Rs. 2,00,000.

Required:

- If the management predicts that the demand for its bottles will require the use of 7,500 machine hours or less during the period, should the special order be accepted? Give reasons.
- If the management predicts that the demand for its bottles will be higher than its ability to produce bottles, should the order be accepted? Why?
- If the management has located a firm that has just entered the moulded plastic business. This firm has considerable excess capacity and more efficient moulding machines and is willing to subcontract the toy job, or any portion of its for Rs. 2.80 per unit. It will contract its own toy mould. Determine Modern Packaging corporation minimum expected excess machine hour capacity needed to justify producing any portion of the order itself rather than subcontracting it entirely.
- The management predicted that it would have 1,600 hours of excess machine hour capacity available during the period. Consequently, it accepted the toy order and subcontracted 36,000 units to the other plastic company. In fact demand for bottle turned out to be 9,00,000 units for the period. The firm was able to produce only 8,40,000 units because it had to produce the toys. What was the cost of the prediction error failure to predict demand correctly?

Question: 6

A processing company, EF, is extremely busy. It has increased its output and sales from 12,900 Kg. in quarter I to 17,300 Kg. in quarter 2 but, though demand is still rising, it cannot increase its output more than another 5% from its existing labour force which is now at its maximum.

Date in quarter 2 for its four products were:

Product	P	Q	R	s
Output(kg)	4,560	6,960	3,480	2,300
Selling price	16.20	11.64	9.92	13.68
Costs:				
Direct labour (at Rs. 6 per hour)	1.96	1.30	0.99	1.70

Direct material	6.52	4.90	4.10	5.42
Direct packaging	0.84	0.74	0.56	0.70
Fixed overhead (absorbed on basis of direct labour cost)	3.92	2.60	1.98	3.40
Total	13.24	9.54	7.63	11.22

The XY company has offered to supply 2,000 Kg of product Q at a delivered price of 90% of EF's selling price. The company will then be able to produce extra product p in its place up to the plant's total capacity. Assume that the market can absorb the extra output and that XY's quality and delivery are acceptable.

A Ltd. produces and markets a range of consumer durable appliances. It ensures after-sales service through X Ltd. the big appliances are serviced at customer's residence while small appliances are serviced at workshop of X Ltd.

The material supplied to X Ltd. is charged at costs at 10% X Ltd charges customers at 25% over the above price. For labour, the company receives 10% of the rate fixed for work done under the after sales service agreement and 15% of the rate fixed in case of jobs not covered under the agreement from X Ltd. 60% by value of the total work under taken by X Ltd, was for big appliances and rest accounted for small appliances during the previous year.

The company decides to carry out all or some of the work itself and has chosen one area in the first instance. During the previous year the company earned a profit of Rs. 2,16,000 as detailed below from X Ltd. for the area chosen:

	Material	Labour
	Rs.	Rs.
Under after-sales service agreement	60,000	1,00,000
For job not covered under the agreement	20,000	36,000

The company forecasts same volume of work in that area for ensuing period. The following three options are under consideration of the management.

- (1) To set up a local service centre to provide service for small appliances only. The existing system is to continue for big appliances
- (2) To set up a local service centre to provide service for big appliances only. The existing system is to continue for small appliances.
- (3) To set up a local service centre to provide service to all appliances. The existing system then stands withdrawn.

The relevant cost for carrying out jobs under the above option are as under :

	Option – I	Option – II	(RS. 000) Option - III
Hest, rent, light etc	125	50	150
Management costs	108	83	150
Service staff costs	230	440	750
Transport costs	25	220	230

You are required to find out the most profitable option.

Question: 7

Pioneer Engineering Company Ltd. has just completed the first year of operation on 30th September 1992 and the summarized result of the operation is given below:

Installed Capacity – 20,000 Kg. : production and sales – 14,000 Kg.

Income and Expenditure details :

(1)	Income	Rs.	Rs.
			28,00,000
(2)	Expenditure:		
	Variable costs :		
	Materials	3,50,000	
	Labour	4,20,000	
	Overheads :		
	Factory	2,80,000	
	Marketing	<u>2,10,000</u>	12,60,000
(3)	Contribution		15,40,000
(4)	Fixed cost		10,00,000
(5)	Profit		5,40,000

- (i) The managing director wishes to expand the operation for the year 1992-93 and has asked you to prepare flexible budgets on capacity utilization levels of 80%, 90% and 100% based on the following estimates:

(a) Prices (Rs. Per kg.) at	80% level – 220
	90% level – 210
	100% level – 200

Whatever produced during the year is expected to be sold within the year.

- (b) Increase in variable cost components:

Materials	@ 12%
Labour	@ 10%
Overheads –	
Factory	@ 15%
Marketing	@ 20%

- (c) Inflation rate applicable to fixed cost is 15% Additionally, if the capacity utilization exceeds 80% level, fixed cost is expected to increase by 10% up to 100% capacity utilization level.

- (ii) To avoid the incidence of increase in fixed cost for production levels beyond 80% capacity utilization, the production manager has submitted a plan to sub-contract the additional production of 4,000 Kg. to a party at a cost of Rs. 105 per kg. including marketing cost . You are requested to comment on this plan of sub-contracting with a view to maximizing the profit of the company .

Question : 8

CA Final May 2001

A Company manufactures two products P and Q. Both the products pass through the company's two department, A and B . The market demand for a month is 2,500 units of P and 2,000 units of Q. The company has a normal capacity of 600 hours in department A and 520 hours in department B per month. Overtime is acceptable upto 50% of normal hours in each department.

The details relating to the products are as under:

	Products	
	P	Q
Direct material cost per unit	Rs. 10	Rs. 5
Fixed overheads per month	Rs. 18,000	Rs. 6,400

	Department	
	A	B
Direct labour time per unit (Minutes)		
Product: P	6	12
Q	18	12
Direct wage rate per hour		
Normal time	10	12
Overtime	15	18

In the event of the company not being able to fulfil the demand for want of capacity, the balance quantity of the products can be sold by buying from a sub-contractor, who has agreed to supply product P at Rs. 18 and product Q at Rs. 12 per unit.

Required

- calculate the quantity of each product to be manufactured and/or to be sub-contracted in a most economical way of fulfilling the market demand.
- Present a statement showing the total costs involved in your solution in (i) above.

Answer: Total cost is Rs. 81,305.

Question : 9

CA Final Nov. 2001

X Ltd. has incurred losses during the past five years. Its projection for the year 2002 is also not very encouraging. The management is seriously considering the closure of the only manufacturing unit. However, it is quite open to getting the products on a sub-contracting basis and to continue its administrative and marketing functions. Currently, four products are being manufactured and sold by catering to different markets. The management is also willing to sacrifice any of these products to ensure survival.

	(Rs. In crores)			
	A (Rs.)	B (Rs.)	C (Rs.)	D (Rs.)
Sales	72.0	54.0	84.0	60.0
Costs:				
Material	48.0	30.0	54.0	36.0
Labour	18.0	12.0	30.0	30.0
Allocated Overheads:				
Manufacturing	06.0	04.8	07.2	04.8
Admins. & Selling	02.4	01.2	03.6	02.4

Total cost	74.4	48.0	94.8	73.2
Profit/(Loss)	(2.4)	06.0	(10.8)	(13.2)

The projected volume and sub-contracting charges are:

	A	B	C	D
Volume ('000 nos.)	2,000	1,500	3,000	2,000
Sub-contracting charges/unit (Rs.)	80	70	90	130

Manufacturing, administrative and selling overheads consist of staff salaries, rent, essential maintenance and tax-payable to the local authorities.

In case the management decides to discontinue the manufacturing operations a minimum notice period of 3 will be required to be given to the staff as well as to the landlords of the manufacturing unit and offices. You may assume that both the manufacturing as well as the administrative and selling overheads are fixed in nature, and that in the notice period mentioned above, these expenses would continue to be incurred.

- Assume that labour costs are related to the volume of operations and do not involve any notice period for discontinuance;
- Assume that the costs are incurred and revenues earned evenly in each of the calendar months

Based on the above, you are required to advise the management on the best option out of the options under its consideration, viz:

- Issue notices to the staff, the landlords of manufacturing unit and offices on the first day of the year and discontinue all the operations that very day.
- Issue notices as above on the first day of the year and continue the operations till the end of the notice period. (only profitable products need to be continued).
- Issues notices to the staff and the landlord, only in the manufacturing unit, resort to sub-contracting and to continue the administrative and marketing functions, (sub-contracting is needed to be done of profitable products only).

Answer: the third option is most viable.

Question : 10

CA Final Nov. 2001

P Ltd. manufactures plastic can of a standard size. The variable cost per can is Rs. 4 and the selling price is Rs. 10 each. The factory of the company has eight machines of identical size. Any individual machine can produce 30 cans per hour. The factory works on a 300 days per annum basis and the actual available hour per machine per day is 7.5. the company has an order of 4,20,000 cans from an oil company, to supply. The yearly fixed cost of the company is Rs. 20 lacs. P . Ltd. has received an order from another firm for supplying 60,000 nos. of plastic moulded toys. The price of the toys is Rs. 60 each and the variable cost is Rs. 50 each. While this order would be acceptable for supplying for total quantities only, on acceptance, a special mould costing Rs. 2,25,000 would be required to be acquired to manufacture the toys. The time study exercise has revealed that 15 nos. of toys can be produced per hour by any of the machines:

Advise the company, with reasons in the following situation:

- (i) Whether to accept the order of manufacturing moulded toys, in addition to supplying 4,20,000 nos. of cans or not;
- (ii) Whether to accept the order of manufacturing moulded toys, if the order of cans increases to 5,40,000 nos. or not;
- (iii) While a sub-contractor is willing to supply the toys, either whole or part of the required quantities at an all inclusive rate of Rs. 57.50 each, what would be the minimum excess capacity needed to justify the manufacturing of any portion of the toys order, instead of sub-contracting?
- (iv) The company had an understanding that the orders of the cans will be increased during the year on negotiation, and planned and manufactured 4,50,000 cans during the year. For utilizing the excess capacity, they also accepted the toys order and sub-contracted only 15,000 nos. of toys. At the year's end, however it was revealed that the order of the cans could be for 4,80,000 nos, if it was properly negotiated. How much loss has been suffered by the company due to improper prediction of demand and negotiation?

Answer: (i) accept the order, increase in profit by Rs. 3,75,000; (ii) No; (iii) 2,000 excess machine hours are required; (iv) Rs. 67,500.

Question : 11

CA Final May 2002

XYZ Limited is currently manufacturing 5,000 units of the product "XY 100" annually, making full use of its machine capacity. The selling price and total costs per unit associated with "XY 100" are as follows:

	Rs.	Rs.
Selling price per unit		900
Costs per unit:		
Direct materials	200	
Variable machine operating costs (Rs. 100 per machine hour)	150	
Manufacturing overhead costs	180	
Marketing and administrative costs	200	730
Operating income per unit of "XY 100"		170

XYZ Limited can use its facility to produce an alternative product "XY 100", if it can outsource those additional units.

ABC limited, a supplier of quality products, has agreed to supply up to 6,000 units of "XY 100" per year at a price of Rs. 650 per unit delivered at XYZ's factory.

XYZ Limited can use its facility to produce an alternative product 'XY 200'. It can sell up to 12,000 units of "XY 200" annually. Estimated selling price and total costs per unit to manufacture and sell 12,000 units of "XY 200" are as follows:

	Rs	Rs
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Selling price per unit		600
Costs per unit:		
Direct materials	200	
Variable machine operating costs (Rs. 100 per machine hour)	50	
Manufacturing overhead costs	60	
Marketing and administrative costs	110	420
Operating income per unit of "XY – 200"		180

Other information pertaining to the operation of XYZ Limited is as follows:

- (a) XYZ limited use machine hours as the basis for assigning fixed manufacturing overhead. The fixed manufacturing overhead for the current year is Rs. 3,00,000. These costs will not be affected by the product-mix decision.
- (b) Variable marketing and administrative costs per unit for various product are as follows :

Manufactured	"XY 100"	Rs. 80
Purchased	"XY 100"	Rs. 40
Manufactured	"XY 200"	Rs. 60

Fixed marketing and administrative costs for the current year is Rs. 6,00,000. These costs will not be affected by the product-mix decision.

Required:

Calculate the quantity of each product that XYZ Limited should manufacture and / or purchase to maximize operating income.

Show your calculations.

Answer: Manufacture "XY 200" 12,000 units; "XY 100" 1,000 units; Purchase "XY 100" 6,000 units.

Question : 12

CA Final May 2003

A company manufactures two products EXE and WYE, which pass through two of its departments exclusively used for them. A market research study conducted by the company reveals that the company can sale either 38,500 units of EXE or 31,500 units of WYE in a year. The manufacturing cost and selling price details are as under:

	EXE	WYE
	Rs/.	Rs.
Selling price per unit	375	540
Costs:		
Department I		
Direct materials	58	100
Direct labour	5 hours,- 50	7.5 hours,- 75
Department II		
Direct materials	21	26

Direct labour	7.5 hours, - 90	10 hours, - 120
Overheads:	Dept. I	Dept. II
Variable overhead rate per direct labour hour	Rs. 2.40	Rs. 3.60
Fixed overheads	Rs. 5,00,000	Rs. 10,00,000
Budgeted direct labour hours	1,75,000	2,80,000

Since the quantity which can be sold exceeded the production capacity, the company has been considering the use of sub-contracting production facilities. Accordingly, when tenders were floated, two contractors responded as under:

Contractor DS offers to produce upto a maximum of 17,500 units of EXE or 14,000 units of WYE in a year for the type of work done by department I of the company. The price charged by DS is Rs. 138 per unit of EXE and Rs. 212 per unit of WYE. These prices included the cost of direct materials used in department I of the company.

Contractor DW can produce upto a maximum of 11,200 units of EXE and 7,000 units of WYE in a year for the type of work done by department 2 of the company. The price charged by DW is Rs./ 150 per unit of EXE and Rs. 192 per unit of WYE. These prices included the cost of direct material used in department 2 of the company

Required :

- (i) If the company does not wish to use the sub-contracting facility, which of the two products and in what quantity should be produced and sold by the company by using its own manufacturing capacity to earn maximum profit? Calculate the resultant maximum profit.
- (ii) If the company wishes to produce either 38,500 units of EXE or 31,500 units of WYE by using sub-contracting facility, state which of the two products should be produced to maximize the profits. Calculate the resultant maximum profit.

Answer: EXE should be produced internally as the resultant profit earned (Rs. 25,95,000) is maximum; (ii) WYE should be produced as it yield Rs. 35,07,328 as profit.

Question : 13

CA Final Nov. 1991

Product A takes five hours to produce on a particular machine and it has a selling price of Rs. 50 and a marginal cost of Rs. 35.

On the same machine, another product B can be made at two hours at a marginal cost of Rs. 5 per unit.

Supplier's price of product B is Rs. 10 per unit.

Assuming that machine hour is the key factor, advise whether product B could be bought out or manufactured.

Answer Product B should be bought

CHAPTER – 10

DECISIONS BASED ON MARGINAL COSTING

Category I – Shut down / Discontinue decisions

Question :1

A paint manufactures 2,00,000 per annum medium-sized tins of "Spray Lac Paints" when working at normal capacity. It incurs the following costs of manufacturing per unit:

	Rs.
Direct material	7.80
Direct labour	2.10
Variable overhead	2.50
Fixed overhead	4.00
Product cost (per unit)	16.40

Each unit(tin) of the product is sold for Rs. 21 with variable selling and administration expenses of 60 paise per tin.

During the next quarter only 10,000 units can be produced and sold. Management plans to shut down the plant estimating that the fixed manufacturing cost can be reduced to Rs. 74,000 for the quarter.

When the plant is operating, the fixed overheads are incurred at a uniform rate throughout the year. Additional costs of plant shut-down for the quarter are estimated at Rs. 14,000.

You are required:

- To express your opinion, along with the calculations as to whether the plant should be shut down during the quarter, and
- To calculate the shut-down point for quarter in units of products (i.e., in terms of number of tins).

Answer: Total loss on Shut-Down = (88,000 Rs.)

Question :2

Normal capacity of a manufacturing concern is 1,00,000 units of a product per year. The unit cost manufacturing at normal capacity as follows:

	Rs.
Direct material	10
Direct labour	5
Variable overhead	2
Fixed overhead	5
Production cost per unit	22
Selling price per unit	25

During the next three months, only 5,000 units can be sold and produced.

Management plans to shut down the plant estimating that fixed overhead can be reduced to Rs. 40,000 for the quarter. It may be assumed that fixed expenses are increased at a uniform rate when the plant is operating. Additional cost of plant shut down for the three months are estimated at Rs. 10,000. Should the plant be shut down for 3 months? What is shut down points in units?

Question :3

A company owns a large number of hardware stores located throughout the country., in one provincial town, there are 2 stores; the accounts of one show a modest profit, but the other Reports a loss as shown by the accounts for the year 1971:

	Rs.	Rs.
Sales		4,00,000
Opening stock	65,000	
Purchases	<u>3,32,000</u>	
	3,97,000	
Closing stock	<u>69,000</u>	<u>3,28,000</u>
Gross profit		72,000
Assistant's salary	55,000	
Drivers wages	3,000	
Manager's wages	8,000	
Staff bonus	4,000	
Rent	13,000	
Heating % lighting	2,000	
Postage	1,300	
Wrapping material	2,000	
National advertising	4,000	
Motor running expenses	1,600	
Depreciation on Motor van	1,600	
Regional office charge	<u>3,000</u>	<u>98,500</u>
Net loss		<u>-26,500</u>

Additional information:

1. There are two motor vans and drivers for the delivery of goods to customers of the two stores and the total costs of this service are apportioned between the stores on the basis of turnover.
2. One manager is responsible for the both the stores and this salary Rs. 16,000 is apportioned equally.
3. The staff bonus is calculated for each store as a percentage on its turnover.
4. The charge for national advertising is allotted to the stores by the H.O.

Give the recommendation either to Discontinue the shoe forever or not.

Answer: Net saving in shut down Rs. 6,900 (sales foregone 4,06,900 avoidable cost)

Question :4

In 2001, the turnover of Ganapati Co. which operated at a margin of safety of 25% amounted to Rs. 9,00,000 and the PV Ratio was 33 1/3%. During 2002, the company estimated that although the same volume of sales as in 2001 would be maintained, the sales value would go down due to decrease in selling price. There will be no change in variable costs. The company proposes to reduce its fixed costs through an intensive cost reduction programme. These changes will alter the PV ratio and Margin of Safety to 30% and 40% respectively in 2002. Even if the company closed down its operations in 2002, it would incur a minimum fixed cost of Rs. 50,000.

Present a comparative statement indicating the sales, variable costs, fixed costs and profits for 2001 and 2002 . at what minimum sales wil the company be better off by locking up the business in 2002?

Question :5

Sumukha Ltd, which manufactures the component EXCEL, has achieved a turnover of Rs.6,00,000 for the calendar year 2002. The Manager of the company has informed that the company has worked at a profit volume ratio of 25% and margin of safety of 20%. But he feels due

to severe competition, the selling price is to be reduced to maintain the same volume of sales for the year 2003. He does not expect any change in variable costs. He expects that due to cost reduction programme, the profit volume ratio and margin of safety will be 20% and 30% respectively and considerable saving in fixed cost for 2003.

Even if the company prefers to shut down its operations for 2003, it expects to incur a minimum fixed cost of Rs. 60,000. You are expected to-

- Present the comparative statement for the year 2002 and 2003 showing under margin costing.
- What will be minimum sales required, if it decides to shut down its unit in 2003?

Question : 6

Dinesh dairies Ltd. Has two processing and bottling plants, Danida and Danima, in adjoining districts. The comparative cost and revenue data budgeted per month are as below:-

	Danida	Danima
Production (Liters)	1,00,000	75,000
	Rs.	Rs.
Variable costs:		
Bottles	1,00,000	79,000
Closures	90,000	71,500
Crates	14,000	12,500
Milk loss	30,000	47,000
Electricity	14,000	14,000
Fuel	40,000	46,000
Water	10,000	11,250
	2,98,000	2,81,250
Fixed costs:		
Electricity	13,500	11,000
Salaries and Wages	90,000	60,000
Depreciation	50,000	20,000
	1,53,500	91,000
Total costs	4,51,500	3,72,250
Sales Realization	7,00,000	5,25,000
Profit	2,48,500	1,52,750

Danima's high cost, low margin status draws management's attention. It is also observed that Danida can increase its production by 50 percent with the existing plant capacity and without additional manpower.

Two proposals are under consideration:

- Cut down Danima's production by 25,000 liters and increase Danida's production by 25,000 liters.
- Cut down Danima's production by 50,000 liters and increase Danida's production by 50,000 liters.

For the additional quantity produced in excess of 1,00,000 liters, Danida will incur Rs. 0.40 per liter towards group incentive. Transporting the additional output from Danida to Danima's region for sale will cost Rs. 10,000 in both cases.

- (a) Prepare a statement to show the contribution and the profit for Danida, Danima and for the company as a whole, for each proposal. Comment on the results.
- (b) The management is keen that the cut Danima's production should not result in its reporting loss, as that would demoralize its employees. If break-even production is to be retained in Danima and the balance alone is to be transferred to Danida. Show the contribution and the profit for Danida, Danima and the company as a whole.

{ Answer:- (a) Budgeted profit Danida Rs. 2,48,500 & Danima Rs. 1,52,750 (I) Proposal I – profit will drop by Rs. 750, (2) Proposal 2 – Profit will increase by Rs. 8,500; (b) (i) Break-even production for Danima 28,000 liters. }

Question : 7

Universe Ltd. Manufactures 20,000 units of X in a year at its normal production capacity. The unit cost as to variable costs and fixed costs at this level are Rs. 13 and Rs. 4 respectively.

Due to trade depression, it is expected that only 2,000 units of x can be sold during the next year. The management plans to shut-down the plant. The fixed costs for the next year then is expected to be reduced to Rs. 33,000. Additional costs of plant shut-down are expected at Rs. 12,000. Should the plant be shut-down? What is the shut-down point?

Answer: Shut-down point 5,000 units.

Category – II Adding or Dropping a product line

Question : 8

Fitwell Ltd. manufacturing company has three factories namely factory "A", factory "B", factory "C". All the three factories produce the same product which is sold at Rs. 375 per unit. The factory wise estimate of operating results for 1998 are as under:

	(Rs. In lacs)			
	A	B	C	Total
Sales	300	1,200	600	2,100
Cost:				
Raw materials	75	350	145	570
Direct labour	75	280	140	495
Factory overheads:				
Variable	20	110	55	185
Fixed	40	120	60	220
Selling & distribution overheads:				
Variable	23	70	40	133
Fixed	15	50	30	95
Administrative overheads	<u>20</u>	<u>90</u>	<u>40</u>	<u>150</u>
Head office expenses	<u>12</u>	<u>50</u>	<u>30</u>	<u>92</u>
Total	<u>280</u>	<u>1,120</u>	<u>540</u>	<u>1,940</u>

Profit 20 80 60 160

When the above estimates were under finalization the company's legal department advised that the lease of factory 'A' was due to expire on 31st December, 1997 and that it could be renewed by enhancing the lease rent by Rs. 12 lacs per annum. Since this enhancement will have heavy impact on the profitability of the company, the management is constrained to examine the proposals, which are as under:

1. Renew the lease and bear the impact.
2. Close down factory 'A' sell off the plant, machinery and stocks and liquidate all liabilities including the staff and workers retrenchment compensation from the sale proceeds which are sufficient for this purpose. In order to maintain the customer relations the total planned output of the factory 'A' will be transferred to either factory 'B' or factory 'C'. Plant capacity is available at both the factories to take over the manufacture. The additional cost involved in the manufacture of the extra output so transferred in factories 'B' and 'C' are estimated as under:

	Factory B	Factory C
(a) Additional fixed O/H due to increased capacity utilization (per annum)	Rs. 50 lacs	Rs. 40 lacs
(b) Additional freight, selling and other O/H to produce and distribute the output to the present customers of factory "A"	Rs. 25 per unit	Rs. 35 per unit

You are required to prepare comparative statement of profitability in the aforesaid alternative courses of action and give your recommendations.

Answer: 148, 182, 167.5 Rs. In lakhs

Question: 9

Dinesh Dairies Ltd. has two processing and bottling plants, Danida and Danima, in adjoining districts. The comparative cost and revenue data budgeted per month are as below:

	Danida	Danima
Production (litres)	1,00,000	75,000
	Rs.	Rs.
Variable costs:		
Bottles	1,00,000	79,000
Closures	90,000	71,500
Creates	14,000	12,500
Milk loss	30,000	47,000
Electricity	14,000	14,000
Fuel	40,000	46,000
Water	10,000	11,250
	<u>2,98,000</u>	<u>2,81,250</u>
Fixed costs:		
Electricity	13,500	11,000
Salaries and wages	90,000	60,000
Depreciation	50,000	20,000
	<u>1,53,500</u>	<u>91,000</u>
Total costs	<u>4,51,500</u>	<u>3,72,250</u>
Sales realization	<u>7,00,000</u>	<u>5,25,000</u>

Profit	2,48,500	1,52,750
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Danima's high cost, low margin status draws management's attention. It is also observed that Danida can increase its production by 50 percent with the existing plant capacity and without additional manpower.

Two proposals are under consideration:

1. Cut down Daniam's production by 25,000 litres and increase Danida's production by 25,000 litres.
2. Cut down Danima's production by 50,000 litres and increase Danida's production by 50,000 litres.

For the additional quantity produced in excess of 1,00,000 liters, Danida will incur Rs. 0.40 per liter towards group incentive. Transporting the additional output from Danida to Danima's region for sale will cost Rs/ 10,000 in both cases.

Prepare a statement to show the contribution and the profit for Danida, Danima and for the company as a whole, for each proposal. Comment on the results.

(B) the management is keen that the cut in Danima's production should not result in its reporting loss, as that would demoralize its employees. If break-even production is to be retained in Denima and the balance alone is to be transferred to Danida. Show the contribution and the profit for Danida Danima and the company as a whole.

Answer: Contribution per unit- 4.02, 3.25, Budgeted 248500, 152750, B.E.P = 28000 , 3,29000, 7,500, 419500(9750), 408640. Loss:- 750, profit = 8,500, 7390,

Question: 10

The directors of a family owned retail departmental store were shocked to received the following profit statement for the year ended 31st January 2009

	Rs. '000	Rs. '000	Rs. '000
Sales		5,000	
Less:- Cost of sales		3,398	1,602
Wages - Departments	357		
- Office	70		
- Restaurant	26	453	
Delivery costs		200	
Departmental expenses		116	
Salaries directors and management		100	
Directors fees		20	
Sales promotion and advertising		120	
Store capacity costs i.e. rent, rates and energy		488	
Interest on bank overdraft		20	
Discounts allowed		25	
Bad debts		15	
Miscellaneous expenses		75	1,632
Net loss			(30)

Management accounting has not been employed but the following breakdown has been extracted from the financial records:

Ladies' wear Men's wear General Toys

Sales	800	400	2200	1400	
Purchase	506	220	1290	1276	167
Opening stock	90	70	200	100	5
Closing stock	100	50	170	200	6
Wages	96	47	155	59	26
Departmental expenses	38	13	35	20	10
Sales promotion and advertising	10	5	30	75	-
Floor space occupied	20%	15%	20%	35%	10%

The directors are considering two separate proposals which are independent of each other.

- (1) Closing and toys department.
- (2) Reducing selling prices on Ladies' Wear and Men's wear by 5% in the hope of boosting sales.

You are required:

- (a) To present the information for the year to 31st January 1990 in a more meaningful way to aid decision making. Include any statistics or indicators of performances which you consider to be useful:
- (b) To show and explain the change in profit for a full year the Toys Department were closed and if all other costs remain the same:
- (c) To show for the Ladies wear and Men's Wear Departments, if selling price are reduced and if all other costs remain the same,
 - (i) The increase in sales value (to the nearest rupees) that would be required for a full year to maintain the gross profit, in rupees earned by each of these Departments; and
 - (ii) The increase (i) above expressed as a percentage of the sales for each departments to 31st January 1990;
- (d) To state your views on both the proposals being considered by the directors and recommend any alternative action you think appropriate.

Question: 11

BG Limited makes engines for motor cars on a contract basis for its parent company and also for two other motor car manufacturers. The cylinder heads and blocks are bought in on a just in time system from a near by independently owned foundry. Other components are received from a variety of suppliers, many of whom are medium sized companies associated with products supplied to the currently depressed car industry.

Within BG Limited there are three main departments matching, assembly and testing/quality control. Support services include a small research and development department, purchasing department, goods receiving department, a tool store and factory offices.

Today, the 25 May, the company has sufficient work for June and one further order for 6000 engines. No further orders are expected until October when it is hoped economic prospect for the motor car industry will have improved. Recently the factory has been working at only 75% of full capacity and the order for 6000 engines represents about one month's production at this level of activity

The management is currently considering two options,

- (i) Complete the order in July and close the factory in August and September.
- (ii) Operate at 25% of full capacity for each of the three months of July, August and September.

Direct labour in the three main departments is estimated to be as follows, per month

	At 75% of full capacity	At 25% of full capacity
Machining	Rs. 25,200	Rs. 9000
Assembly	80,400	26,000
Testing/Quality Control	42,000	14,000

If the factory is shut down, the direct labour force will be temporarily laid off and you may assume no direct labour costs will be incurred when there is no production. The factory has been in operation for less than two years and no trades unions are involved.

Costs, other than direct labour costs, are shown in the schedule printed below and give figures for 75% and 25% of full capacity working and also if the factory is idle.

You are required. As the management accountants:

- To prepare a financial statement and a brief report, addressed to the production director, which recommends the action to be taken on the basis of the information available.
- To list and comment briefly on three other costs not appearing in the schedule printed below which might be relevant to the discussion; there is no need to attempt to quantify or estimate figures for such costs.

BG Limited:

Schedule of costs, per month, other than direct labour, estimated at the three different levels of activity.

	75%	25%	Idle
	Rs.	Rs.	Rs.
Depreciation buildings	43000	43000	43000
Depreciation Plant and machinery	3,50,000	1,90,000	1,00,000
Power	8,000	2,800	600
Supervisory labour	7,000	7,000	7,000
Indirect labour			
Machining	8,000	4,000	2,000
Assembly	4,000	2,000	Nil
Testing\quality control	2,400	1,200	Nil
Research and development	5,000	5,000	5,000
Receiving and tool store	9,600	4,800	2,400
Staff salaries	17,000	17,000	17,000
Operating (consumable) supplies:			
Machining	800	200	Nil
Assembly	400	100	Nil
Testing\quality control	600	200	100
R & D and purchasing\receiving	1,000	1,000	1,000
Factory office	1,400	400	400
Salary and wage related costs	25,400	11,000	2,300
Lighting and heating	4,000	3,000	1,000
Fire insurance	2,000	2,000	2,000
Employers, liability insurance	2,000	700	200
Repairs and maintenance	8,000	8,000	2,000
Total	4,99,600	3,03,400	1,86,000

Question: 12

The original budget for the K department of H Ltd. for the forthcoming year was as follows:

Budgeted sales and production 30,000 units		
	Per unit of output Rs.	Total for 30,000 units (Rs. '000s)
Sales revenue	10.0	300
Manufacturing cost		
Material A (1 liter per unit)	2.0	60
Material B (1 Kg per unit)	1.5	45
Production labour	2.0	60
Variable overhead	1.0	30
Fixed manufacturing overhead	2.0	60
	8.5	255
Non manufacturing costs	1.0	30
Total costs	9.5	285
Budgeted not profit for the year	0.5	15

As part of H Ltd.'s long term strategic plan the K department was due to be closed at the end of the forthcoming year.

However rumours of the closure have resulted in the majority of K's labour force leaving the firm and this has forced the abandonment of the original budget for the department. The managing Director has suggested that the department could be closed down immediately or, by employing contract labour, could be operated to produce 10,000 or 20,000 units in the year. With the exception of the foreman (see note V) the few remaining members of K's production labour force would then be redeployed within the firm.

The following further information is available.

- (i) Each hour to be trained at a fixed cost Rs. And will produce one unit of the product. Contract labour would have to be trained at a fixed cost of Rs. 20,000.
- (ii) There are 30,000 litres of material A in stock. This material has no other use and any of it not used in department K will have to be disposed of Costs of disposal will Rs. 2,000 plus Rs. 0.50 per liter disposed of.
- (iii) There are 15,000 kgs of material B in stock. If the material is not used in department k then up to 10,000 kgs could be used in another department to substitute for an equivalent weight of a material which currently costs Rs. 1.8 per kg. Material B originally costs Rs. 1.5 per kg and its current market price (buying or selling) is Rs. 2.0 per kg. costs to H. Ltd of selling any surplus material B will amount to Rs. 1.00 per kg sold.
- (iv) Variable overhead will be 30% higher per unit produced than originally budgeted.
- (v) Included in "fixed manufacturing overhead" are:-
 - (a) Rs. 6000 salary of departmental foreman.
 - (b) Rs. 7000 depreciation of the machine used in the department.

If the department is closed immediately, the foreman, who will otherwise retire at the end of the year, will be asked to retire early and paid Rs. 2000 compensation for agreeing to this.

The only machine used in the department originally cost Rs. 70,000 and could currently be sold for Rs. 43,000. This sale value will reduce to Rs. 40,000 at the end of the year and, if used for any production during the year, will decrease by a further Rs. 500 per 1,000 units produced.

- (vi) All other costs included in "Fixed manufacturing overhead" and "non-manufacturing costs" are apportionments of general overheads none of which will be altered by any decision governing the K department.
- (vii) The sales Manager suggests that the sales volumes of 10,000 units could be achieved if the unit sales price were Rs. 9.00. A Sales volume of 20,000 units would be achieved if

the sales per unit were reduced to Rs. 8 and an advertising campaign costing Rs. 15,000 were undertaken.

Required:

- (a) Advise H Ltd. if its best course of action regarding department K, presenting any data in tabular form.
- (b) For each of the following separate circumstance, show how the advice given in (a) above is altered.
 - (i) Immediate closure of department K would enable its factory space to be rented out for one year at a rental of Rs. 8,000.
 - (ii) The quoted level of efficiency of the contract labour is the average for production of the first 5,000 units and any additional production would reflect of the 90% learning curve which will be experiences. Show also that revised contract labour costs.
 - (iii) Ignore taxation and the time value of money.

Question: 13

A company having its head office in ceetown has three factories situated at uptown, Middletown and downtown. The operations of Middletown have been up profitable for a number a years. The leasehold of Middletown will also expire by the end of the current year.

In view of the continued losses the management has decided to close down the said factory rather than lease. The factory's plant and machinery can be sold at a price higher than the written down value and the surplus funds will be sufficient to cover all termination cost.

The projected profitability of the factories for the year as under:

	Uptown	Middletown	Downtown	Total
Sales	400	100	300	800
Variable costs	220	75	195	490
Fixed Costs:				
Factory	80	30	40	150
Selling and admn.	30	5	15	50
Head office expenses apportioned	25	15	25	65
Profit/Loss	45	(25)	25	45

The company, however, would like to continue to serve the customers now being served by the Middletown factory if it could do so economically. Accordingly the following proposals were put forward for consideration based on a selling price of Rs. 250 per unit.

- (i) Close down Middletown factory and expand the operations of the downtown factory for which capacity exists there. This proposal will involve the following changes.
 - (a) Sales revenue of downtown factory wi8ll increase by 25%
 - (b) The factory fixed costs of downtown factory will increase 10%
 - (c) Fixed selling and administration costs of the said factory will increase by 5%
 - (d) Variable distribution costs of the additional output will increase by Rs. 4 per unit
- (ii) Close down Middletown factory and expand the operations of the uptown factory subject to the following changes in case of the latter.
 - (a) Sales revenue will increase by Rs. 80 lacs.
 - (b) Factory fixed costs will increase by 20%
 - (c) Fixed selling and administration costs will increase by 10%
 - (d) Variable distribution costs in respect of the additional units will increase by Rs. 5 per unit.

- (iii) Close down Middletown factory and enter in to a long term contract with an independent manufacturer to serve the customers of Middletown factory. The manufacturer pay a royalty of Rs. 5 per unit to the company. In the event the sales of the area served by the Middletown factory will fall by 25% .
- (iv) Close down Middletown factory and discontinue servings the present customers of the areas.

You are required to evaluate each of these proposals and advise the management of the action to be taken in the interest of improving the profitability of the company.

Question: 14

Elec Ltd. is engaged in the manufacture of four products in its factory. The production and sales volume is much lower than the normal volume and so there is substantial unfavorable variance in the recovery of overheads. The sales and cost data for a year are as under:

	A	B	C	D	Total
Sales	400	500	200	100	1200
Direct material	64	70	32	7	173
Direct wages	88	105	60	18	271
Factory overheads	128	172	120	24	444
Selling and administration overheads	80	100	40	20	240
Total costs	360	447	252	69	1228
Profit\loss	40	53	-52	31	72
Unabsorbed overheads					48
Net Profit					24

50% of the factory overheads is variable at normal operating volume and the variable selling and administration overheads account for 5% of sales.

Of the total sales of product C half of the volume is used in the market for application in which increased by Rs. 100 lacs without any change in fixed selling expenses.

Of the total sales of product C about 25% is sold in conjunction with product A. The customers will not be able to substitute product D and so the sales of product A will be reduced by 12.5% of the present level if product C is withdrawn.

In the event of total discontinuance of product C the fixed factory and selling and administration overheads will be reduced by Rs. 20 lacs. Alternatively, if the production and sales of product C is maintained to the extent of 25% of the present levels as services to product A there will be a reduction in the fixed costs to the extent of Rs. 10 lacs.

You are required to :

- (a) Prepare statement to show the financial position of
 - (i) Continuance of product C
 - (ii) Total discontinuance of product C
 - (iii) Continuance of product C only as services as service to customers using product A whose business will otherwise be lost.
- (b) Make your recommendations on the course of action to be taken by the company with such comments as you may like to offer.

Question: 15

G Ltd. has prepared the following budget estimates for 1987-88.

	Product A 6000 Rs.\unit	Product B 16000 Rs.\unit
Sales(units)		
Selling price	40	64
Direct materials	12	22
Direct wages @ Rs. 1 per hour	8	12
Variable overheads	4	6
Fixed overheads	8	12
Total	32	52
Profit	8	12

After the finalization of the above manufacturing programme, it is observed that one third capacity of the company is still idle. In order to improve the working the following proposals are up for consideration:

- (i) Discontinue product A and the capacity so released will be used on product B. The selling price of product B however will be reduced by Rs. 2 per unit on the entire sales due to increased volume of sales.
- (ii) Discontinue product B and divert the capacity of meeting an export demand for product C whose unit cost data are as under

Selling Price	52
Direct material	15
Direct labour	10
Variable overheads	5
- (iii) Utilized the idle capacity for meeting an export demand for product D whose unit cost data are as under:

Selling price	72
Direct material	40
Direct labour	20
Variable overheads	10
- (iv) Hire out the idle capacity hours by fixing a price in such a way that the same rate of profit per direct labour hour as obtained in the original budget estimates is achieved. Indicate the hire charges per direct labour hour.

Required:

- (a) Prepare a statement showing the profitability as envisaged in the original programme.
- (b) Evaluate each of the four proposal independently and present statements showing overall profitability under each proposal.

Category III – Marketing Decisions

Question:16

Soft Drinks Ltd., bottles and distributes “Amrit” brand cold drinks. It operates its distribution division as a cost centre. Budgeted cost for the year ending 31st March, 1996 is as follow:

Cash Operating Costs	21,00,000
Depreciation on Fleet of Vehicles	4,20,000
Apportioned Corporate Costs	3,00,000
	28,20,000

Distribution division has started operation on 1st April, 1994. Each vehicle of the fleet was acquired at a cost of Rs. 2,40,000 and had an estimated economic life of four years. Salvage value of each vehicle at the end of four years. Salvage value of each vehicle at the end of four years (March 31st 1998) was estimated at Rs. 30,000.

Countrywide Distributors Ltd. Which has countrywide network for the distribution of food and beverages has offered Soft Drinks Ltd. A three year distribution contract for Rs. 19,50,000 each year. The contract will start on 1st April, 1995.

If Soft Drinks Ltd. Accepts the offer, it will close down its own distribution division, and will sell the delivery vehicles. Current (April 1, 1995) disposal price of each vehicle is estimated at Rs. 75,000. Soft Drinks Ltd. Will avoid cash operating cost of Rs. 21,00,000.

Security analysis have recommended the purchase of share of Soft Drinks Ltd., security analysis are forecasting a net profit of Rs. 6,60,000 for 1995-96 as against an estimated profit of Rs. 6,30,000 of 1994-95, the forecast assumes that the company will continue operation of its distribution division.

Required:

- Tabulate a comparison of all relevant cost for next three years (1995-96 to 1997-98) for the two alternatives-use of own distribution division or use of countrywide distributors. Recommend whether soft drinks ltd. Should accept the offer of countrywide distributors.
- Why might Soft Drinks Ltd. Be reluctant, to accept the offer of countrywide distributors?

(Ignore Income-tax and time value of money. Wherever appropriate, suitable assumptions to be made by you.)

Answer:

Relevant cost:	95-96	96-97	97-98
Own Dis.	2,100	2,100	1,860
Countrywide Dis.	1,350	1,950	1,950

Question : 17

ZED LTD. Manufactures a range of products which it sells through manufacturer’s agents to whom it pays commission of 20% of the selling price of the products. Its budgeted profit and loss statement for 1987 is as follows:-

	Rs.	Rs.
Sales		22,50,000
Production costs:		
Prime costs and variable overhead	7,87,500	
Fixed overhead	3,62,500	
		11,50,000
Selling costs:		
Commission to manufacturer's agents	4,50,000	
Sales office expenses (fixed)	20,000	
		4,70,000
		6,30,000
Administration costs(fixed)		3,00,000
Profit		3,30,000

Subsequent to the preparation of the above budgeted profit and loss statement, the company is faced with a demand from its agents for an increase in their commission to 22% of selling price. As a result, the company is considering whether it might achieve more favourable results if it were to discontinue the use of manufacturer's agents and, instead employ its own sales force. The costs that this could involve are budgeted as follows:-

Sales Manager (salary and expenses)	75,000
Salesmen's expenses (including travelling costs)	20,000
Sales office costs (additional to present costs)	50,000
Interest and depreciation on sales department cars	35,000

In addition to the above, it will be necessary to hire four salesmen at a salary of Rs. 40,000 per annum each plus commission of 5% on sales plus car allowance of Rs. 1 per kilometer to cover all costs except interest and depreciation.

On the assumption that the company decides to employ its own sales forces on the above terms, you are required to ascertain:

- What is the maximum average kilometer per annum that salesmen could travel if the company is to achieve the same budgeted profit as it would have obtained by retaining the manufacturer's agents and granting them the increased commission they had requested. Assume that sales in each case would be as budgeted.
- At what level of sale would the original budgeted profit be achieved if each salesman were to travel an average of 14,000 kilometers per annum. Assume that all other assumptions inherent in the budgets were maintained.
- What is the maximum level of commission on sales that the company could afford to pay if it wished to achieve a 16% increase in sales (at budgeted selling price) and average of 16000 kilometres per annum to be travelled by each salesman, (Calculate your answer to one decimal place.)

Answer:-

- Net savings = Rs. 42,500 and Re. 1 per km. The maximum kms. To be travelled is 42500 or maximum average kms per salesman is 10,625 kms.
- Contribution required Rs. 14,08,500.
- Amount available for commission Rs. 2,27,200 Maximum level of sales required – 8.7% of sales value.

Question: 18

Sweet Dreams Ltd. manufactures and markets three products A, B, and C in the state of Haryana and Rajasthan. At the end of first half of 1996-97 the following absorption based profit statement has been drawn by the accountant:

	Haryana	Rajasthan	Total
Sales	3000	900	3900
Manufacturing cost of sales	2331	699	3030
Gross profit	669	201	870
Administration Expenses (a)	120	36	156
Selling Expenses (b)	184	169	353
Total Expenses	304	205	509
Net Profit	365	(-4)	361

(A) The expenses are constant and common to both the states. They stand allocated on the basis of sales.

(B) The expenses are semi-fixed but specifically relate to the respective state.

The management is worried to note that the decision taken to market the products in Rajasthan to utilize idle capacity has proved wrongly and wish to cover only Haryana state.

The incharge of marketing division is not satisfied with the above way of profit presentation. He is of the firm opinion that sales affected in the state of Rajasthan is contributing profits. For the next half year he expects no increase in demand in Haryana while for Rajasthan he anticipates to sell B or C more by 50% of existing sales. This will utilize the idle capacity in full.

The product wise details for the first half of 1996-97 are:

	A	B	C
Sales (in Rs. '000)			
Haryana	1200	900	900
Rajasthan	300	300	300
Variable costs (as a % on sales):			
Manufacturing	40	35	30
Selling	3	2	2
Specific fixed manufacturing expenses (in Rs. '000)	570	470	610

You are required to :

- Prepare state wise profit statement for the first half of 1996-97 using contribution approach also offer your views on the contention of the management and opinion expressed by incharge of marketing division.
- Prepare a product wise profit statement for the same period using contribution approach
- Submit your well thought out recommendation as to which product should be produced to utilize idle capacity.

Question: 19

Home comfort ltd. deal in three products Ace. Nice and Grace and these are sold directly through sales men in three zones, prime, Extension and Outreach. The responsibility for sales promotion rests with the headquarter and so does the overall control of distribution and sales.

Cost of sales:

ACE	:	85% of sale
NICE	:	80% of sale
GRACE	:	75% of sale

Details of sales and selling and distribution expenses for the year are as follows:

		Sales	S&D Expenses Allocated Direct
Prime Zone	Ace	9,00,000	63,990
	Nice	9,00,000	84,465
	Grace	4,50,000	47,160
		22,50,000	1,95,615
Extension Zone	Ace	6,75,000	46,710
	Nice	4,50,000	47,700
	Grace	2,25,000	23,940
		13,50,000	1,18,350
Outreach Zone	Ace	2,25,000	18,900
	Nice	1,80,000	15,165
	Grace	4,95,000	66,375
		9,00,000	1,00,440

Selling and distribution expenses at headquarters are as follows:

Office expenses	94,500
Advertisement	1,35,000
Other expenses	1,21,500

Advertisement costs are allocated to zones and products on the basis of sales. Office expenses and other expenses are apportioned equally to the zones or the products while computing the profit or loss for the zones or the products as the case may be.

Required:

Prepare a comparative profit and loss statement presenting zonal performance as distinct from production performance.

Prepare a comparative profit and loss statement presenting zonal performance as distinct from production performance.

Question:20

SM Ltd. is engaged in the manufacture of a range of consumer products. The sales are made through its own authorized agents who are paid a commission of 20 per cent on the selling price of the product. The company has prepared the following budget for 1990.

	Rs. In lakhs
Sales	225.00
Production costs :	
Prime cost and variable overheads	78.75
Fixed overheads	36.25
Selling cost :	
Agents commission (20%)	45.00
Sales office expenses (fixed)	2.00
Administration costs (fixed)	30.00
Total cost	192.00

Profit

33.00

The company after the finalization of the above budget is faced with a demand. From its agents for an increase in their commission to 22 per cent of selling price. The company is therefore contemplating to dispense with the services of agents and instead employ its own sales force in that event the company expects to incur the following costs :

	Rs. In lakhs
Sales Manager's salary and expenses	7.50
Salesman expenses, including traveling expenses	2.00
Sales office costs (in addition to the present costs)	5.00
Interest & dep. on sales dept. vehicles	<u>3.50</u>
Total	<u>18.00</u>

In addition to the above it will be necessary to hire 40 salesman at a salary of Rs. 40,000 per annum each plus a commission of 5 per cent on sales plus car allowance of Rs. 1 per kilometer to cover vehicle costs except interest and depreciation which has already been considered above.

Assuming that the company decides in favour of employing its own sales force, you are required to answer the following question.

1. For the same volume of sales as envisaged in the budget what is the maximum average kilometer per annum that the salesman could travel if the company is to achieve the same budgeted profit as it who have obtained by retaining the agents and granting them the increased commission which they had demanded.
2. At what level of sales would the original budgeted profit be achieved if each salesman were to travel an average of 14,000 Km per annum. Assume all assumption inherent in the budget are maintained.
3. What is maximum level of commission on sales that the company could afford to pay if it wished to achieve a 16 per cent increase in its original budgeted profit and expected a 16 per cent increase in sales at the budgeted selling prices and an average of 16000 km per annum of travel by each salesman.

Answer: 4,25,000 Km, , 8.7%, 234,75,000)

Category IV – Second Shift Working

Question :- 21

A divisional of manufacturing company is now producing product “A” on single shift basis. The annual production is 1,50,000 units. The selling price is Rs. 100 per unit. The cost data is as under:-

Direct labour 50,000 hours at Rs. 50 per hour	
Direct material	Rs. 55 per unit
Other variable costs	Rs. 9,75,000 per annum
Divisional fixed cost	Rs. 35 lakhs per annum

The company is desirous of improving its profitability by increasing its production and sales to 2,50,000 units. The company is confident of the sales potential of the increased production. However, the increase in production would involve working a full second-shift production. The labour efficiency in second shift is expected to be lower, and as such direct labour hours required in second shift for the increased production would be 42,000 hours. The direct labour cost per hour in second shift including O.T. would be Rs. 68. Additional fixed cost required would be Rs. 8 lakhs

You are required to :

- Advise whether the second shift working should be taken up.
- Compare the profits before and after introduction of second shift.
- Offer your comment on the introduction of second shift from the business point of view rather than from profit angle.

Category V – Choice of supplier

Question :-22

A ltd. Has set up a treatment plant at Surat. The company uses raw material X to convert into finished product. “XA” after treatment in its plant having a capacity to treat 60,000 tonnes of X per annum. There is no loss of raw material in the treatment process. The variable costs of treatment are Rs. 5 per ton and the annual fixed costs amount to Rs. 7,50,000.

The company owns a fleet of vehicles to transport 260 lakhs tones-kms. of “X” to the factory site. The fixe costs of maintain these vehicles amount to Rs. 10,40,000 per annum and the variable costs amount to 8 paise per tone-km. the company delivers “XA” to customers through another transport agency at 15 paise per tone-km. subject to a minimum annual payment of Rs. 1,25,000. Facilities for hiring the transport for incoming of X and outgoing of “XA” are also available through Global Transport Co. at a cost of 18 paise per tone-km.

The company has three sources of procurement of raw material X , the relevant details being:

	Source of procurement		
	Town A	Town B	Town C
Quantity available (tones p.a.)	9,000	8,000	45,000
Distance from Surat (Kms.)	300	250	300
Price offered (per tonne)	Rs. 90	Rs. 110	Rs. 78

The company has demand of its finished product “XA” from the following customers:

Customers	Demand (tones p.a.)	Price (per ton)	Delivery terms	Distance from Surat (kms.)
L	6,000	200	At customer’s site	9
M	6,000	188	Ex-factory Surat	-
N	15,000	170	Ex-factory Surat	-
O	9,000	150	Ex-factory Surat	-
P	10,000	192	At customer’s site	22
Q	9,000	220	At customer’s site	14
R	10,000	200	At customer’s site	25
	65,000			

You are required to recommend the best proposal for the purchase of raw material X the break-up of sale of finished product “XA”, and transport plan for incoming and outgoing goods with a view to maximize the profit.

Also, present a statement to show new profit as per above recommendation.

Answer:- (i) Per tone-km. cost of using own vehicles is less (Rs. 0.12) than other proposal of Gload Transport Co. (18 paise). The concern should continue to transport raw material X by using its own fleet of vehicles; (ii) Best Proposal for the purchase of raw material X from town A, B, & C , 9,000 8,000 & 42,600 tonnes respectively; Break-up of sales value of finished product XA Rs. (‘000) 11,318; (iv) Net profit Rs. (‘000) 2,020.2.

Question :- 23

A manufacturing company produce a chemical product which passes through two processes factory and finishing. It has the capacity to process an input of 1,00,000 kgs. of raw-material. Normal scrap will be 10% and 5% of input in factory and finishing process respectively. The realizable value of

such scrap is Rs. 4 and Rs. 8 per kg. respectively for factory and finishing process to be credited against the cost of respective process.

Relevant cost data for the coming year are:-

	Factory process	Finishing Process
	Rs.	Rs.
Direct Wages	6,00,000	5,50,000
Overheads	2,28,000	4,22,900

There are three possible sources of purchase of raw-materials:-

Supplier	Purchase price per kg.	Maximum quantity
	Rs/.	Kgs.
X	5.00	60,000
Y	5.60	80,000
Z	5.30	Provided entire quantity of 1,00,000 kgs. Is ordered, otherwise at Rs. 5.80 per kg.

In each case the company is required to collect the raw-material from the godown of supplier. Variable transport cost depends upon the distance involved. The same are as under:-

Supplier	X	Y	Z
Transport cost (per kg)	30 paise	25 paise	25 paise

Fixed transport costs would be Rs 1,00,000 per annum irrespective of the supplier to be contacted. The output of the finishing process can be sold to three prospective customers, their offer being as follows:

Customer	Price per kg. of output	Trade discount	Conditions
	Rs.	(%)	
A	32.50	2	Maximum quantity 40,000 kgs.
B	32.00	2	Maximum quantity 80,000 kgs.
C	30.90	-	Provided the entire output is sold to him

In case of supplies to customers A and B, the fixed delivery costs will be Rs. 1,500 per month and the variable delivery costs will be 65 paise and 36 paise per kg. respectively.

Customer C will collect the entire output from the ware house of the company.

You are required to indicate with reasoning:-

- Choice of supplier with comparative cost tables.
- Choice of customer with comparative tables of net realizations.

Also prepare the statement showing process costs and overall results.

Answer:- (i) Total cost per kg. X – Rs. 5.30 Y – Rs 5.85, Z – Less than 1,00,000 kgs. Rs. 6.05; 1,00,000 kgs. Rs. 5.55; (ii) Output of finishing process 85,500 kgs. Net realization per kg. A (upto 40,000 kgs.) Rs. 31.20, B (upto 80,000 kgs.) – Rs. 31.00 C (upto 85,500 kgs.) Rs. 30.90; Net realization from I Alternative – Rs. 26,40,500 & from II Rs. 26,41,950; (iii) cost of factory process Rs. 14,40,000; Cost Finishing process 23,76,900 (iv) Net profit Rs. 2,65,050.

Chapter – 11

Standard Costing

Question 1.

Rs. Ltd. has established the following standard mix for producing 9 tonnes of product Z.

		Rs.
5 tonnes of material A at Rs. 7 per tonnes	=	35
3 tonnes of material B at Rs. 5 per tonnes	=	15
2 tonnes of material C at Rs. 2 per tonnes	=	4
		Rs. 54

A standard loss of 10% of input is expected to occur. Actual input was as under:

53000 tonne of material A at Rs. 7 per tonnes.

28000 tonne of material B at Rs. 5.30 per tonnes.

19000 tonne of material A at Rs. 2.20 per tonnes.

Actual output for a period was 92700 tones of product Z.

Compute:

- (i) Material Mix Variance;
- (ii) Material Yield Variance;

Question 2.

S.V. Ltd. manufactures BXE by mixing three raw materials. For every batch of 100 kgs. of BXE, 125 kgs. of raw materials are used. In April 2007 60 batches were prepared to produce an output of 5600 kgs. of BXE. The standard and actual particulars for April 2006 are as under:-

Raw material	Standard		Actual		Quantity Purchased
	Mix	Price per kg.	Mix	Price per kg.	
	%	Rs.	%	Rs.	Kg.
A	50	20	60	21	5000
B	30	10	20	8	2000
C	20	5	20	6	1200

Calculate all Material variances.

Question 3.

One kilogram of product 'K' requires two chemicals A and B. The following were the details of product 'K' for the month of June 2007:

- (a) Standard mix Chemical 'A' 50% and chemical 'B' 50%.
- (b) Standard price per kilogram of Chemical 'A' Rs. 12 and chemical 'B' Rs. 15.
- (c) Actual input of chemical 'B' 70 kilograms.

- (d) Actual price per kilogram of Chemical 'A' Rs. 15.
- (e) Standard normal loss 10% of total input.
- (f) Materials cost variance total Rs. 650 adverse.
- (g) Materials yield variance total Rs. 135 adverse.
- (h) Actual output is 90 kg.

You are required to calculate:

- (1) Material mix variance
- (2) Material usage variance
- (3) Material price variance
- (4) Actual loss of actual input
- (5) Actual input of Chemical 'A'
- (6) Actual price per kilogram of Chemical 'B'.

Question 4.

Compute the missing data indicated by the Question Marks from the following:

Particulars	A	B
Standard Price/Unit	Rs. 12	Rs. 15
Actual Price/Unit	Rs. 15	Rs. 20
Standard Input (kgs.)	50	?
Actual Input (kgs.)	?	70
Material Price Variance	?	?
Material Usage Variance	?	Rs. 300 Adverse
Material Cost Variance	?	?

Material mix variance for both products together was Rs. 45 Adverse.

Question 5.

Eskay Ltd. produces an article by blending two basic raw materials. The following standard have been set up for raw materials:

Material	Standard Mix	Standard Price per kg.
A	40%	Rs. 4.00
B	60%	Rs. 3.00

The standard loss in processing is 15%. During September, 1990, the company produced 1700 kg. of finished output.

The position of stock and purchases for the month of September, 1990 is as under:

Material	Stock on 1.09.90	Stock on 30.9.90	Purchased during September, 90	
	Kg.	Kg.	Kg.	Cost Rs.
A	35	5	800	3400
B	40	50	1200	3000

Calculate the following variances:

- (a) Material price variance
- (b) Material usage variance
- (c) Material yield variance
- (d) Material mix variance
- (e) Total material cost variance.

Assume first in first out method for the issue of material. The opening stock is to be valued at standard price.

Question 6.

The standard material inputs required for 1000 kgs. of a finished product are given below

<i>Material</i>	<i>Quantity (in kg.)</i>	<i>Standard rate per kg. (in Rs..)</i>
P	450	20
Q	400	40
R	250	60
	1100	
Standard loss	100	
Standard output	1000	

Actual production in a period was 20000 kgs. of the finished product for which the actual quantities of material used and the prices paid thereof, are as under:

<i>Material</i>	<i>Quantity (in kg.)</i>	<i>Standard rate per kg. (in Rs..)</i>
P	10000	19
Q	8500	42
R	4500	65

Calculate the :

- (i) Material Cost Variance;
- (ii) Material Price Variance;
- (iii) Material Usage Variance;
- (iv) Material Mix Variance;
- (v) Material Yield Variance;

Present a reconciliation among the variances. (I.C.W.A. Inter, June, 1996-Stage I)

Answer: (i) 39,500 (ii) 29,500 (iii) 10,000 (iv) 26,363 (v) 36,363

Question 7.

XYZ Company manufactures a product ABC by mixing three raw materials. For every 100 kgs. of ABC, 125 kgs. of materials are used. In April, 1990, there was an output of 5600 kg of ABC. The standard and actual particulars of April, 1990 are as follows:

Raw Material	Standard		Actual	
	Mix	Price per kg.	Mix	Price per kg.
	%	Rs.	%	Rs.
Raw Material I	50	40	60	42
Raw Material II	30	20	20	16
Raw Material III	20	10	20	12

Calculate all variances.

(I.C.W.A. Inter, June, 1990)

Answer: Material Price Variances: 5,600 Material Mix Variances : 14,000
 Material Yield Variances : Nil Material Usage Variances : 14,000
 Material Cost Variances : 19,600

Question 8.

Modern Tiles Ltd. makes plastic tiles of standard size of 6" x 6" x 1/8". From the following information **you are required** to calculate for direct materials:

- (i) Cost variance in total;
- (ii) Cost variance sub-divided into (a) price and (b) usage;
- (iii) The usage variance analysed to show: (a) mix and (b) yield.

<i>Direct Material</i>	<i>Quantity (kg.)</i>	<i>Standard rate per kg.</i>
A	600	Re. 0.90
B	400	0.65
C	500	0.40

During December, 1993, eight mixes were processed and actual materials consumed were:

<i>Direct Material</i>	<i>Quantity (kg.)</i>	<i>Standard rate per kg.</i>
A	5000	Re. 0.85
B	2900	0.60
C	4400	0.45

Actual production for December was 620000 tiles. (C.S. Inter, December, 1992)

Answer: (i) Cost Variance in Total = 220 A. (ii) (a) 175 F. (b) 395 A. (iii) (a) 55 F. (b) 450 A.

Question 9.

'X' Ltd. is producing floor covers in roll of standard size measuring 3 meters wide and 30 meters long by feeding raw materials to a continuous process machines. Standard fixed for a batch of 900 sq. meters of floor cover is as follows:

2000 kg. of material A at Re. 1.00/g.

800 kg. of material B at Rs. 1.50/kg.

20 gallons of material C at Rs. 30/gallon.

During the period, 1505 standard size rolls were produced from the material issued for 150 batches.

The actual usage and the cost of materials were:

300500 kg. of material A at Rs. 1.10/kg.

119600 kg. of material B at 1.65/kg.

3100 gallon of material C at Rs. 29.50/gallon.

Present the figures to the management showing the break-up of material cost variances arising during the period. (I.C.W.A. Inter, December 1984)

Answer : (i) MPV = 46,440 A. (ii) MMV = 2900 A (iii) MYV = 1900 A (iv) MUV = 1000 A (vi) MCV = 47440 A

Question 10.

A gang of workers normally consists of 30 men, 15 women and 10 boys. They are paid at standard rates as under :

Men Re. 0.80

Women Re. 0.60

Boys Re. 0.40

In a normal working week of 40 hours, the gang is expected to produce 2000 units of output.

During the week ended 31st March, 1993, the gang consisted of 40 men, 10 women and 5 boys. The actual wages paid were at the rate of Re. 0.70, Re. 0.65 and Re. 0.30 respectively. 4 hours were lost due to abnormal idle time and 1600 units were produced. Calculate : (i) Labour cost variance, (ii) Labour rate variance, (iii) Labour efficiency variance, (iv) Labour mix variance, (v) Labour idle time variance.

Answer (i) LRV = 160 F (ii) LMV = 120 A (iii) LITV = 148 A (iv) LYV = 148 A (v) LEV = 416 A (vi) LCV = 256 A

(B. Com Hons. Delhi, 1993)

Question 11.

The standard labour complement and the actual labour complement engaged during the month are given below:

	Skilled	Semi-skilled	Unskilled
(a) Standard number of workers in a group	30	10	10
(b) Standard wage rate (Rupees per hour)	5	3	2
(c) Actual number of workers employed during the month in the group	24	15	12
(d) Actual wage rate per hour (Rs.)	6	2.5	2

During the month of 200 working hours, the group produced 9600 standard hours of work.

Required:

Calculations showing Wage rate variance, Labour efficiency variance, Labour mix variance and Total labour cost variance.

(I.C.W.A. Inter, June, 1995-Stage I, December, 1985)

Answer (i) WRV = 3300 A (ii) WGV = 3000 F (iii) LEV = 2400 A (iv) WCV = 2700 A

Question 12.

The following was the composition of a gang of workers in a factory during a particular month, in one of the production departments. The standard composition of workers and wage rate per hour were as below:

Skilled : Two workers at a standard rate of Rs. 20 per hour each.
 Semi-skilled : Four workers at a standard rate of Rs. 12 per hour each
 Unskilled : Four workers at a standard rate of Rs. 8 per hour each.

The standard output of the gang was four units per hour, of the product.

During the month in question, however, the actual composition of the gang and hourly rates paid were as under:

Nature of worker	No. of Worker	Wage rate paid per worker
------------------	---------------	---------------------------

		<i>per hour engaged</i>
Skilled	2	Rs. 20
Semi-skilled	3	14
Unskilled	5	10

The gang was engaged for 200 hours during the month, which included 12 hours when no production was possible, due to machine break-down, 810 units of the product were recorded as output of the gang during the month.

You are required:

- to compute the standard unit labour cost of the product;
- to compute the total variance in labour cost during the month; and
- analyse the variances in (b) above into sub-variances and reconcile.

(I.C.W.A. Inter, December, 1996-Stage I)

Answer (i) LRV = 3200 A (ii) LGV = 800 F (iii) LITV = 1440 A (iv) LYV = 1740 F (v) LEV = 1100 F (vi) LCV = 2100 A

Question 13.

100 skilled workmen, 40 semi-skilled workmen and 60 unskilled workmen were to work for 30 weeks to get a contract job completed. The standard weekly wages were Rs. 60, Rs. 36 and Rs. 24 respectively. the job was actually completed in 32 weeks by 80 skilled, 50 semi-skilled and 70 unskilled workmen who were paid Rs. 64, Rs. 40 and Rs. 20 respectively as weekly wages.

Find out the labour cost variance, labour rate variance, labour mix variance and labour efficiency variance.

(I.C.W.A. Inter, June, 1992)

Answer (i) LRV = 10240 A (ii) LMV = 19200 F (iii) LEV = 17760 A (iv) LCV = 8800 A
Note: as per standard the work should have been done in 30 weeks.

Question 14.

A gang of workers usually consists of 10 men, 5 women and 5 boys in a factory. they are paid at standard hourly rates of Rs. 1.25, Re. 0.80 and Re. 0.70 respectively. In a normal working week of 40 hours, the gang is expected to produce 1000 units of output.

In a certain week, the gang consisted of 13 men, 4 women and 3 boys. Actual wages were paid at the rates of Rs. 1.20, Re. 0.85 and Re. 0.65 respectively. Two hours were lost due to abnormal idle time and 960 units of output were produced.

Calculate various labour variances.

(C.S. Inter, June, 1993)

Answer (i) WRV = 24 F (ii) WGV = 62 A (iii) WITV = 40 A (iv) WYV = 8 F (v) WEV = 94 A (vi) LCV = 70 A

Question 15.

The following details are available from the records of ABC Ltd. engaged in manufacturing Article 'A' for the week ended 28th September.

The standard labour hours and rates of payment per article 'A' were as follows:

	Hours	Rate per hour	Total
Skilled labour	10	Rs. 3.00	Rs. 30
Semi-skilled labour	8	1.50	12
Unskilled labour	16	1.00	16
			58

The actual production was 1000 units of articles 'A' for which the actual hours worked and rates are given below:

	Hours	Rate per hour	Total
Skilled labour	9000	Rs. 4.00	Rs. 36000
Semi-skilled labour	8400	1.50	12600
Unskilled labour	20000	0.90	18000
			66600

From the above set of data you are asked to calculate :

- (a) Labour cost variance (b) Labour rate variance
(c) Labour efficiency variance (b) Labour mix variance

(I.C.W.A. Inter, December, 1987)

Answer (i) LRV = 7000 A (ii) LGV = 4200 F (iii) LYV = 5800 A (iv) LCV = 8600 A (v) LEV = 1600 A

Question 16.

The direct labour strength of a section of an engineering factory is 100 workers paid at the rate of Rs. 6.00 per day of 8 hours each. The normal production is 1000 pieces per week of 48 hours. During a particular week an order for 1500 pieces was completed expending in all 7650 hours made up of 6300 hours at normal wages and 1350 hours at overtime wage at double rate. The total wages come to Rs. 6300. Calculate the average labour cost per piece during the week and analyse the labour cost variance for the week.

(I.C.W.A. Inter, December, 1982 ; June, 1986)

Answer (i) WRV = 562.50 A (ii) WEV = 337.50 A (iii) WCV = 900 A

Question 17.

Direct Materials	Rs.
2 units of A at Rs. 4 per unit	8.00
3 units of B at Rs. 3 per unit	9.00
15 units of C at Re. 1 per unit	15.00
	32.00
Direct Labour 3 hrs. @ Rs. 8 per hour	24.00
Total Standard Prime Cost	56.00

The company manufactured and sold 6000 units of the product during the year, Direct **Material Costs** were as follows:-

12500 units of A at Rs. 4.40 per unit.

18000 units of B at Rs. 2.80 per unit.

88500 units of C at Rs. 1.20 per unit.

The company worked 17500 direct labour hours during the year. For 2500 of these hours the company paid at Rs. 2 per hour while for the remaining the wages were paid at the standard rate. Calculate Materials Cost, Price and usage variances and Labour cost, Rate and Efficiency Variances.

Answer (i) MPV = 19100 A (ii) MUV = 500 A (iii) LRV = 10000 A (iv) LEV = 4000 F

Question 18.

From the particulars given below, compute: Material Price Variance, Material Usage Variance, Labour Rate Variance, Idle Time Variance and Labour Efficiency with full working details:

1 tonne of material input yield a standard output of 100000 units. The standard price of material is Rs. 20 per kg. Number of employees engaged is 200. The standard wage rate per employee per day is Rs. 6. The standard daily output per employee is 100 units. The actual quantity of material used is 10 tonnes and the actual price paid is Rs. 21 per kg. Actual output obtained is 900000 units. Actual number of days worked is 50 and actual rate of wages paid is Rs. 6.50 per day. Idle time paid for and included in above time is 1/2 day.

Answer (i) MPV = 10000 A (ii) MUV = 20000 A (iii) LRV = 5000 A (iv) LITV = 600 A (v) LYV = 5400 A (vi) LEV = 6000 A

Question 19.

From the following data prepare a unit cost statement showing the prime cost of products A and B together with analysis of variance:

		Product 'A'	Product 'B'
Material	Standard	600 kg. @ Rs. 5.00	90 kg. @ Rs. 3.00
	Actual	580 kg. @ Rs. 5.50	100 kg. @ Rs. 2.80
Labour	Standard	80 kg. @ Rs. 2.00	16 kg. @ Rs. 2.80
	Actual	92 kg. @ Rs. 1.75	14 kg. @ Rs. 2.60

(I.C.W.A. Inter, June 1998-Stage I.

Answer:

Particular	Product A	Product B
MPV	290 A	20 F
MUV	100 F	30 A
MCV	190 A	10 A
LRV	23 F	2.80 F
LEV	24 A	5.60 F
LCV	1 A	8.40 F
Total Cost Variance	191 A	1.60 A

Question 20.

The following standards have been set to manufacture a product :

Direct Material :	Rs.
2 units of A @ Rs. 4 per unit	8.00
3 units of B @ Rs. 3 per unit	9.00
15 units of C @ Rs. 1 per unit	15.00
Direct Labour : 3 hrs @ Rs. 8 per hour	32.00
Total standard prime cost	24.00
	56.00

The company manufactured and sold 6000 units of the product during the year. Direct material costs were as follows:

12500 units of A at Rs. 4.40 per unit

18000 units of B at Rs. 2.80 per unit

88500 units of C at Rs. 1.20 per unit

The company worked 17500 direct labour hours during the year. For 2500 of these hours, the company paid at Rs. 12 per hour while for the remaining, the wages were paid at standard rate. Calculate materials price variance and usage variance and labour rate and efficiency variance.

(C.A. Inter, May 1986; I.C.W.A. Inter, December, 1998)

Answer: (i) MPV = 19100 A (ii) MUV = 500 A (iii) LRV = 10,000 A (iv) LEV = 4,000 F

Question 21.

From the particulars given below, compute: Material Price Variance, Material Usage Variance, Labour Rate Variance, Idle Time Variance and Labour Efficiency Variance with full working details:

1 tonne of material input yields a standard output of 100000 units. The standard price of material is Rs. 20 per kg. Number of employees engaged is 200. The standard wage rate per employee per day is Rs. 6. The standard daily output per employee is 100 units. The actual quantity of material used is 10 tonnes and the actual price paid is Rs. 21 per kg. Actual output obtained is 900000 units. Actual number of days worked is 50 and actual rate of wages paid is Rs. 6.50 per day. Idle time paid for and included in above time is $\frac{1}{2}$ day.

(C.A. Inter, May, 1996)

Answer : (i) MPV = 10,000 A (ii) MUV = 20,000 A (iii) LRV = 5,000 A (iv) LITV = 600 A (v) LYV = 5,400 A (vi) LEV = 6,000 A

Question 22.

From the following data of A Co. Ltd. relating to budgeted and actual performance for the month of March '87, compute the Direct Materials, Direct Labour Cost Variances.

Budgeted data for March :

Units to be manufactured	150000
Units of Direct Material required (based on standard rates)	495000
Planned Purchase of Raw Materials (units)	540000
Average Unit Cost of Direct Material	Rs. 8
Direct Labour Hours per unit of finished goods	3/4 hr.
Direct Labour Cost (total)	Rs. 2992500
Actual data at the end of March :	
Units actually manufactured	160000
Direct Material Cost (purchase cost based on units actually issued)	Rs. 4341900
Direct Material Cost (purchase cost based on units actually purchased)	4510000
Average unit cost of Direct Material	8.20
Total Direct Labour Hours for March	125000
Total Direct Labour Cost for March	3375000

(I.C.W.A. Inter, December, 1988)

Answer : (i) MPV = 1,05,900 A (ii) MUV = 12,000 A (iii) MCV = 1,17,900 A (iv) LRV = 50,000 A (v) LEV = 1,33,000 A (vi) LCV = 1,83,000 A

Question 23.

Actual variable overhead	Rs. 10000
Budgeted variable overhead	Rs. 12000
Budgeted production	500 units
Actual production	450 units
Actual hours	200
Standard time for 1 unit	30 minutes

Question 24.

AB Company Limited is having Standard Costing system in operation for quite some time. The following data relating to the month of April, 1994, is available from the cost records:

	Budgeted	Actual
Output (in units)	30000	32500
Operating hours	30000	33000
Fixed Overheads (Rs.)	45000	50000
Variable Overheads (Rs.)	60000	68000
Working Days	25	26

You are required to work out the relevant variances (on the basis of output).

(I.C.W.A. Inter, June, 1994; December, 1991)

Answer: (i) Variable Overhead Expenditure Variance = 2,000 A (ii) Variable Overhead Efficiency Variance = 1,000 A (iii) Fixed Overhead Expenditure Variance = 5,000 A (iv) Fixed Overhead Calendar Variance = 1,800 F (v) Fixed Over head Capacity Variance = 2700 F (vi) Fixed Overhead Efficiency Variance = 750 A (vii) Fixed Overhead Volume Variance = 3750 F (viii) Fixed Overhead Variance = 1250 A
--

Question 25.

A labour-intensive production unit operation as standard absorption cost accounting system provides the following information for period 10:

Normal capacity, in direct labour hours	9600
Budgeted variable production overhead	Rs. 3 per direct labour hour
Budgeted fixed production overhead per four-week financial period	Rs. 120000
To produce one unit of output it takes two hours of working.	
Actual figures produced for the four-week period 10 were:	
Production, in units	5000
Variable production overhead incurred	Rs. 28900
Fixed production overhead incurred	118000
Actual direct labour hours worked	9300

You are required:

- (a) to calculate, in accordance with the 1991 edition of the Institute's Terminology, the variances for
 - (i) variable production overhead expenditure variance,
 - (ii) variable production overhead efficiency variance,
 - (iii) fixed production overhead expenditure variance,
 - (iv) fixed production overhead volume variance.
- (b) to sub-divide your volume variance produce for (a) (iv) above into two sub-variance and explain the meaning of these in the brief form to management.

(CIMA, London, November, 1992)

Answer: (i) Variable Overhead Expenditure Variance = 100 A (ii) Variable Overhead Efficiency Variance = 2100 F (iii) Fixed Overhead Expenditure Variance = 2,000 F (iv) Fixed Overhead Capacity Variance = 3750 A (v) Fixed Overhead Efficiency Variance = 8,750 F (vi) Fixed Overhead Volume Variance = 5000 F

Question 26.

The following information was obtained from the record of a manufacturing unit using standard costing system.

	Standard	Actual
Production	4000 units	3800 units
Working days	20	21
Fixed Overhead	Rs. 40000	Rs. 39000
Variable Overhead	12000	12000

You are required to calculate the following overhead variance:

- (a) Variable overhead variance
- (b) Fixed overhead variances:
 - (i) Expenditure variance
 - (ii) Volume variance
 - (iii) Efficiency variance
 - (ii) Calendar variance

- (c) Also prepare a reconciliation statement for the standard fixed expenses worked out at Standard Fixed Overhead Rate and the Actual Fixed Overhead.

(C.A. Inter May, 1985)

Answer : (i) Fixed Overhead Expenditure Variance = 1000 F (ii) Fixed Overhead Calendar Variance = 2000 F (iii) Fixed Overhead Capacity Variance = Nil (iv) Fixed Overhead Efficiency Variance = 4000 A (v) Fixed Overhead Volume Variance = 2000 A (vi) Fixed Overhead Variance = 1000 A

Question 27.

From the following, prepare variance analysis of a particular department for a month:

Variable overhead items	Actual (Rs.)
Materials handling	8325
Idle time	850
Rework	825
Overtime premium	250
Supplies	4000
	14250
Fixed overhead items	
Supervision	1700
Depreciation Plant	2000
Depreciation Equipment	5000
Rates	1150
Insurance	350
	10200

Normal capacity 10000 standard hours, budgeted rate Rs. 1.70 per standard hour for variable overhead and Re. 1.00 per standard hour for fixed overhead. Actual level : 8000 standard hours.

(I.C.W.A. Inter, June, 1987)

Answer : Variable Overhead Expenditure Variance = 50 A (ii) FOEV = 200 A (iii) FOCV = 2000 A (iv) FOV = 2200 A

Question 28.

A company has a normal capacity of 120 machines, working 8 hours per day of 25 days in a month. The fixed overheads are budgeted at Rs. 144000 per month. The standard time required to manufacture on unit of product is 4 hours.

In April, 1998, the company worked 24 days of 840 machine hours per day and produced 5305 units of output. The actual fixed overheads were Rs. 142000.

Compute :

- | | |
|-------------------------|-------------------------------------|
| (i) Efficiency variance | (ii) Capacity variance |
| (iii) Calendar variance | (iv) Expense variance |
| (v) Volume variance | (vi) Total fixed overheads variance |

(C.A. Inter, May, 1998)

Answer : (i) 6360 F (ii) 17280 A (iii) 5760 A (iv) 2000 F (v) 16680 A (vi) 14680 A

Question 29.

S.V. Ltd. has furnished the following data :

	Budget	Actual, July (1999)
No. of working days	25	27
Production in units	20000	22000
Fixed overheads	Rs. 30000	Rs. 31000

Budgeted fixed overhead rate is Re. 1.00 per hour. In July, 1999, the actual hours worked were 31500.

Calculate the following variances:

- (i) Efficiency variance.
- (ii) Capacity variance.
- (iii) Calendar variance.
- (iv) Volume variance.
- (v) Expenditure variance.
- (vi) Total overhead variance.

(C.A. Inter, November, 1981; I.C.W.A. Inter, December, 1991; C.S. Inter, June, 1999)

Answer (i) 1500 F (ii) 900 A (iii) 2400 F (iv) 3000 F (v) 1000 A (vi) 2000 F

Question 30.

The following data has been collected from the cost records of a unit for computing the various fixed overhead variances for a period:

Number of budgeted working days	25
Budgeted man-hours per day	6000
Output (budgeted) per man-hour (in units)	1
Fixed overhead cost as budgeted	Rs. 150000
Actual number of working days	27
Actual man-hours per day	6300
Actual output per man-hour (in units)	0.9
Actual fixed overhead incurred	Rs. 156000

Calculate fixed overhead variances:

- (a) Expenditure Variance,
- (b) Calendar Variance,
- (c) Capacity Variance,
- (d) Efficiency Variance,
- (e) Volume Variance,
- (f) Fixed Cost Variance,

(I.C.W.A. Inter, December, 1995-Stage I; C.A. Inter, November, 1981; C.A. Final, May, 1983-Similar)

Answer : (a) 6000 A (b) 12000 F (c) 8100 F (d) 17010 A (e) 3090 F (f) 2910 A

Question 31.

In Department A of a plant, the following data are submitted for the week ended 31st March, 1993:

Standard output for 40 hrs. per week	:	1400 units
Budgeted fixed overheads	:	Rs. 1400
Actual output	:	1200 units
Actual hours worked	:	32 hours
Actual fixed overheads	:	Rs. 1500

You are required to prepare a statement of variances. *(I.C.W.A. Inter, June, 1993)*

Answer : (i) Fixed Overhead Expenditure Variance = 100 A (ii) Fixed Overhead Capacity Variance = 280 A (iii) Fixed Overhead Efficiency Variance = 80 F (vi) Fixed Overhead Volume Variance = 200 A

Question 32.

Following information is available from the records of a factory:

	Budget	Actual
Fixed overhead for June	Rs. 10000	Rs. 12000
Production in June (units)	2000	2100
Standard time per unit (hours)	10	
Actual hours worked in June		22000

Compute :

- | | |
|------------------------------------|-----------------------------|
| (i) Fixed overhead cost variance ; | (ii) Expenditure variance ; |
| (iii) Volume variance ; | (iv) Capacity variance ; |
| (v) Efficiency variance ; | |

(CA, Inter, November 1989)

Answer : (i) 1500 A (ii) 2000 A (iii) 500 F (iv) 1000 F (v) 500 A

Question 33.

Show the following information as it would appear in a production overhead control account complete with all figures and the account balanced off:

Variable overhead incurred	Rs. 52000
Variable overhead absorbed - 5500 hours at Rs. 9 per hour	49500
Variable overhead expenditure variance	?
Fixed overhead incurred	53750
Fixed overhead absorbed-5500 hours at Rs. 9 per hour	49500
Fixed overhead expenditure variance - adverse	8750
Fixed overhead volume variance	?

Answer: (i) VOEV = 2500 A (ii) FOV = 4250 A

Question 34.

A Cost Accountant of a Company was give the following information regarding the overheads for February 2007:

- (a) Overheads cost variance Rs. 1400 Adverse.
- (b) Overheads volume variance Rs. 1000 Adverse.
- (c) Budgeted hours for February 2007 1200 hours.
- (d) Budgeted overheads for February 2007 Rs. 6000.
- (e) Actual rate of recovery of overheads Rs. 8 per hour.

You are required to assist him in computing the following for February 2007:

- (1) Overheads expenditure variance.
- (2) Actual overheads incurred.
- (3) Actual hours for actual production.
- (4) Overheads capacity variance.
- (5) Overheads efficiency variance.
- (6) Standard hours for actual production.

Answer :

Question 36.

The budgeted and the actual sales for a period in respect of three products are give below:

Budgeted figures

Product	Quantity	Price Rs.	Value Rs.
A	1000	5	5000
B	750	10	7500
C	500	15	7500
	2250		20000

Actual

Product	Quantity	Price Rs.	Value Rs.
A	1200	6	7200
B	700	9	6300
C	600	14	8400
	2500		21900

Calculate sales variances.

Question 37.

AB Ltd. furnishes the following information relating to budgeted sales and actual sales for April 2007.

	Product	Sales quantity	Selling price per
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		units	unit Rs.
Budgeted Sales	A	1200	15
	B	800	20
	C	2000	40
Actual sales	A	880	18
	B	880	20
	C	2640	38

Calculate the following variances:

1. Sales value variance
2. Sales volume variance
3. Sales price variance
4. Sales mix variance
5. Sales Qty. variance

Question 38.

1991 - Nov [1] {C} (a) Trident Toys Ltd. had drawn up the following Sales Budget for August, 1991:-

'Bravo' Toys 5000 units at Rs. 100 each
 'Champion' Toys 4000 units at Rs. 200 each
 'Super' Toys 6000 units at Rs. 180 each

The actual sales for August, 1991 were:

'Bravo' Toys 5750 units at Rs. 120 each
 'Champion' Toys 4850 units at Rs. 180 each
 'Super' Toys 5000 units at Rs. 165 each

The costs per unit of Bravo, Champion and Super Toys were Rs. 90, Rs. 170 and Rs. 130 respectively.

Analyse the variances to show:

- (a) the effects on turnover:
 - (i) Sales price variance
 - (ii) Sales quantity variance
 - (ii) Sales mix variance
 - (iv) Total sales value variance
- (b) the effects on profit:
 - (i) Sales margin : Price variance
 - (ii) Sales margin : Quantity variance
 - (ii) Sales margin : Mix variance
 - (iv) Total sales margin variance.

Question 39.

X Ltd. has budgeted the following sales for the month of August, 1998:

Product A : 800 units @ Rs. 100 per unit.

Product B : 700 units @ Rs. 200 per unit.

The actual sales for the month were as follows:

Product A : 900 units @ Rs. 110 per unit.

Product B : 800 units @ Rs. 180 per unit.

The costs per unit of products A and B were Rs. 80 and Rs. 170 respectively.

You are required to compute the different variances to explain the difference between the budgeted and actual profits.

Answer: (i) Sales Value Price Variance = 100, (ii) Sales Value Mix Variance = 222 (iii) Sales Value Quantity Variance = 2222 (iv) Sales Value Variance = 1900 (v) Sales Value Volume Variance = 2000

Question 40.

SQC Ltd. provides the following data for the month of October, 1999:

Budget			
Product	Budgeted Sales Quantity	Budgeted Selling Price per unit (Rs.)	Standard Cost Per Units (Rs.)
A	2160	12	9
B	1440	5	3

Actuals			
Product	Budgeted Sales Quantity	Budgeted Selling Price per unit (Rs.)	Standard Cost Per Units (Rs.)
A	2240	11	8
B	960	6	5

You are required to compute:

- (i) Sales margin quantity variance
- (ii) Sales margin mix variance
- (iii) Sales margin volume variance
- (iv) Sales margin price variance
- (v) Sales margin total variance

Answer: Sales Margin Price Variance = 1280 A, Sales Margin Mix Variance = 320 F, Sales Margin Quantity Variance = 1040 A, Sales Margin Variance = 2000 A, Sales Margin Volume Variance = 720 A

Question 41.

2007 - Nov [2] KPR Limited operates a system of standard costing in respect of one of its products which is manufactured within a single cost centre. The Standard Cost Card of a product is as under :

Standard	Unit cost	(Rs.)
Direct material	5 kgs @ Rs. 4.20	21.00
Direct labour	3 hours @ Rs. 3.00	9.00
Factory overhead	Total manufacturing cost	3.60
	Total manufacturing cost	33.60

The production schedule of the month of June, 2007 required completion of 40000 units. However, 40960 units were completed during the month without opening and closing work-in-process inventories.

Purchases during the month of June, 2007, is 225000 kgs of material at the rate of Rs. 4.50 per kg. Production and Sales records for the month showed the following actual results:

Material used 205600 kgs.

Direct labour 121200 hours; cost incurred Rs. 387840

Total factory overhead cost incurred Rs. 100000

Sales 40000 units

Selling price to be so fixed as to allow a mark-up of 20 percent on selling price.

Required:

- Calculate material variances based on consumption of material.
- Calculate labour variances and the total variance for factory overhead.
- Prepare Income statement for June, 2007 showing actual gross margin.
- An incentive scheme is in operation in the company where by employees are paid a bonus of 50% of direct labour hour saved at standard direct labour hour rate. Calculate the Bonus amount.

Answer: (i) MCV = 65040 A (ii) MPV = 61680 A (iii) MUV = 3360 A (iv) LCV = 19200 A (v) LRV = 24240 A (vi) LEV = 5040 F (vii)

Question 42.

2008 - May [2] TQM Ltd. has furnished the following information for the month ending 30th June, 2007.

	Master Budget	Actual	Variance
Units produced and sold	80000	72000	40000 (A)
Sales (Rs.)	320000	280000	6400 (F)
Direct material (Rs.)	80000	73600	15200 (F)
Direct wages (Rs.)	120000	104800	2400 (F)
Variable overheads (Rs.)	40000	37600	800 (F)
Fixed overhead (Rs.)	40000	39200	
Total Cost	280000	255200	

The Standard costs of the products are as follows:

Per unit

(Rs.)

Direct materials (1 kg. at the rate of Re. 1 per kg.)	1.00
Direct wages (1 hour at the rate of Rs. 1.50)	1.50
Variable overheads (1 hour at the rate or Re. 0.50)	0.50

Actual results for the month showed that 78400 kg. of material were used and 70400 labour hours were recorded.

Required :

- Prepare Flexible budget for the month and compare with actual results.
- Calculate material, labour, sales price, variable overhead and fixed overhead expenditure variances and sales volume (profit) variance.

(10 + 5 = 15 marks)

Answer : (a) MPV = 4800 F (b) MUV = 6400 A (c) MCV = 1600 A (d) LRV = 800 F (e) LEV = 2400 F (f) LCV = 3200 F (g) Sales Price Variance = 8000 A (h) Variable Overhead Expenditure Variance = 2400 A (i) Fixed Overhead Expenditure Variance = 800 F (j) Sales Volume Variance = 4000 A

Question 43.

New look Enterprises Ltd. has furnished the summary Profit and Loss Account of the firm for the year ended 31st March, 2001 along with that of the previous year, as follows:

Profit and Loss Account

	Prev. year	Year ended 31.03.2001 (In lakhs of rupees)
Materials consumed	160	231
Wages	100	138
Variable overheads	40	48
Fixed overheads	20	30
Profit	80	93
Total	400	540

During the year ended 31st March 2001 there was an average increase of 10% in the cost of materials and 15% in wage rates. To neutralise this cost increase, the firm raised the selling price by 8%.

You are required to analyse the details suitably and prepare a statement indicating the factors responsible for the difference in profit between the two years, together with their respective contributions.

(I.C.W.A. Inter, June, 2001 ; a December, 1995-Stage II)

Answer : (i) MPV = 21 A (ii) MVV = 10 A (iii) WRV = 18 A (iv) WEV = 5 F (v) VOE = 2 F (vi) FOV = 10 F

Question 44.

A company operates a standard cost system to control the variable works cost of its only product.

The following are the details of actual production, costs and variances for November 2000.

Production and cost (actuals)		Cost Variances	
Production	10000 units	Direct materials-Price	Rs. 5000 (F)
Direct materials (105000 kg.)	Rs. 520000	Direct materials-Usage	Rs. 25000 (A)

Direct labour (19500 hrs.)	Rs. 308000	Direct labour-Rate	Rs. 15500 (A)
Variable Overheads	Rs. 410000	Direct labour-Efficiency	Rs. 7500 (F)
		Variable Overheads	Rs. 10000 (A)

The Cost Accountant finds that the original standard cost data for the product is missing from the cost department files. The variance analysis for December 2000 is held up for want of this data. You are required to reconstruct the standard cost data (both quantity and price) per unit from the available details for November 2000.

(I.C.W.A. Inter, December, 2000-Stage II)

Answer: Standard Cost Card showing Standard Cost data per unit

Direct Material : 10 Kg. @ Rs. 5 = Rs. 50
Direct Labour : 2 Hrs. @ Rs. 15 = Rs. 30
Variable Overhead Per Unit = Rs. 40

Total Variable Cost Rs. 120

Question 45.

In chemical manufacturing company production is carried on in batches. Detail of standard input of materials, labour, overheads etc. are as follows:

Standard input of materials per batch of 1000 kg.

A : 60% of input @ 15/kg.
B : 20% of input @ Rs. 20/kg.
C : 20% of input @ Rs. 25/kg.

Labour : 1200 hrs. per batch @ Rs. 10 per hour
Variable Overhead : Rs. 2 per kg.
Fixed Overhead : Rs. 50000 per month
Selling Price : Rs. 50 per kg.
Standard production per month : 10 batches. There is no processing loss.

Actual details for November, 1996 were as follows:

Number of batches processed : 8
Materials consumed A 5000 kg - Rs. 76000
B 1500 kg - Rs. 30000
C 1500 kg - Rs. 48000
Labour engaged for 9800 hrs. Wages paid Rs. 95000
Variable overhead Rs. 15000
Fixed overhead Rs. 52000

The output for the month was sold @ Rs. 54 per kg.

Required :

- Budgeted profit for November 1996 and actual profit made.
- Analysis of the variance in profit.

(I.C.W.A. Inter, December, 1996-Stage II)

Answer : 1. Budgeted Profit = Rs. 13,000 and Actual Profit = 1,16,000 2. (i) MUV = 4020 A (ii) MCV = 219 A (iii) LRV = 650 F (iv) LEV = 2200 A (v) LCV = 1550 A (vi) Variable Overhead

Expenditure Variance = 975 A (vii) Variable Overhead Efficiency Variance = 1500 A (viii) Variable Overhead Variance = 2475 A

Question 46.

The following data relate to actual output, costs and variances for the four-weekly accounting period number 4 of a company which makes only one product. Opening and closing work-in-progress figures were the same.

Actual production of Product XY	18000	units
Actual costs incurred:	(Rs. '000)	
Direct materials purchased and used 150000 kilograms	210	
Direct wages 32000 overhead	136	
Variable production overhead	38	
Variances:	(Rs. '000)	
Direct material price	15	Favourable
Direct materials usage	9	Adverse
Direct labour rate	8	Adverse
Direct labour efficiency	16	Favourable
Variable production overhead expenditure	6	Adverse
Variable production overhead expenditure	4	Favourable

Variable production overhead varies with labour hours worked.

A standard marginal costing system is operated.

You are required to : present standard product cost sheet for one unit of Product XY;

(CIMA London, May, 1987)

Question 47.

JS Limited used a full standard cost system with raw materials inventory carried at standard. The following data was taken from the records of the company for the year ended 31.12.1989:

Opening raw materials inventory	300	
Closing raw materials inventory	250	
Net purchases	410	
Material price variance	10	(A)
Material usage variance	20	(A)
Direct labour cost (Actual)	900	
Direct labour cost at standard	840	
Actual overhead cost incurred	875	
Overheads cost variance	45	(F)
Opening work-in-progress inventory	120	
Closing work-in-progress inventory	140	

Opening finished goods inventory	360	
Cost of goods sold reported	2240	

Note. (F) denotes favorable and (A) denotes adverse

You are required to compute :

(1) Raw material purchases at standard. (2) Raw material consumed at actual. (3) Raw material consumed at standard. (4) Labour cost variance. (5) Standard overhead costs. (6) Total manufacturing cost at standard. (7) Cost of goods manufactured. (8) Cost of products sold to customers. (9) Closing finished goods inventory.

(C.A. Inter, November, 1990)

Answer: 1. 400 ; 2. 450 ; 3. 430 ; 4. 60 A ; 5. 920 ; 6. 2190 ; 7. 2170 ; 8. 2195 ; 9. 335

Question 48.

In a certain period, results were as follows:

Output	:	6500 units
Wages paid	:	Rs. 48750 for 16250 hours
Material	:	Rs. 34000 for 4000 kgs.
Variances:		
Labour rate	:	Rs. 1875 (adverse)
Labour efficiency	:	Rs. 1275 (favourable)
Labour idle time	:	Rs. 700 (adverse)
Material price	:	Rs. 1850 (favourable)
Material usage	:	Rs. 1200 (favourable)

Calculate the standard prime cost per unit.

(C.S. Inter, December, 1999)

Answer: Rs.13

Question 49.

The details regarding a food product manufactured by ABC Co. for the last one week are as follows:

Standard Cost (for one unit)

Direct Materials	10 units @ Rs. 1.50	Rs. 15
Direct Wages	5 hours @ Rs. 8	40
Production Overheads	5 hours @ Rs. 10	50
		105
Actuals (for whole activity) :		
Direct Materials	Rs. 6435	
Direct Wages	Rs. 16324	
Analysis of Variances:		

Direct Materials		
Price	Rs. 585	(Adverse)
Usage	Rs. 375	(Favourable)
Direct Wages (Labour):		
Rate	Rs. 636	(Favourable)
Efficiency	Rs. 360	(Adverse)
Production Overheads :		
Expenditure	Rs. 400	(Favourable)
Volume	Rs. 750	(Favourable)

You are required to calculate :

- actual output units;
- actual price of material per unit ;
- actual wage rate per labour hour ;
- the amount of production overhead incurred; and
- the production overhead efficiency variance.

(C.A. Inter, May, 1999)

Answer: (i) 415 units (ii) Rs. 1.65 (iii) Rs. 7.70 (iv) Rs. 19,600 (v) Rs. 450 A.

Question 50.

ABC Ltd. is following a standard costing system. The standard output for a period is 20000 units. Details relating to standard cost and profit per unit are given below:

Direct material (3 units @ Rs. 1.50)	Rs. 4.50
Direct labour (3 hours @ Re. 1.00)	3.00
Direct expenses	0.50
Factory overheads :	
-- Variable	0.25
-- Fixed	0.30
Administration overhead	8.85
Total Cost	
Profit	1.15
Selling price (fixed by the government)	10.00

The actual production and sales for the period was 14400 units. There has been no price revision by the government during the period.

The following are the variances worked out at the end of the period:

	Favourable Rs.	Adverse Rs.
Direct Material :		

Price		4250
Usage	1050	
Direct Labour :		
Rate		4000
Efficiency	3200	
Factory Overheads:		
Variable expenditure	400	
Fixed Expenditure	400	
Fixed Volume		1680
Administration Overheads:		
Expenditure		400
Volume		1680

You are required to ascertain the details of the actual costs and prepare a profit and loss statement for the period showing the actual profit/loss. Show the working clearly.

Answer: Actual profit = 9600.

(I.C.W.A. Inter, June, 1995)

Question 51.

The budgeted output of a single product manufacturing company for 1984-85, was 5000 units. The financial results in respect of actual output of 4800 units achieved during the year, were as under :

Direct Material	Rs. 29700	Fixed Overheads	Rs. 39000
Direct Wages	44700	Profit	36600
Variable Overheads	72750	Sales	222750

The standard direct wage rate is Rs. 4.50 per hour and the standard variable overhead rate is Rs. 7.50 per hour.

The cost accounts recorded the following variances for the year:

Variances	Favourable (Rs.)	Adverse (Rs.)
Material price	-	300
Material usage	-	600
Wage rate	750	-
Labour efficiency	-	2250
Variable overhead expense	3000	-
Variable overhead efficiency	-	3750
Fixed overhead expense	-	1500
Selling price	6750	-

Required to :

- Prepare a statement showing the original budget.

Question 56.

Despite the increase in the Sales price of its sole product to the extent of 20% , a company finds that it has incurred a loss during the year 1998-99 to the extent of Rs. 4 lakhs as against a profit of Rs. 5 lakhs made in 1997-98. This adverse situation is attributed mainly to the increase in prices of materials and overheads, the increase over the previous year being, on the average, 15%, and 10% respectively.

The following figures are extracted from the books of the company:

	31-3-98	31-3-99
	Rs.	Rs.
Sales	1,20,00,000	1,29,60,000
Cost of sales:		
Material	80,00,000	91,10,000
Variable overhead	20,00,000	24,00,000
Fixed overhead	15,00,000	18,50,000

Required:

Analyse the variances over the year in order to bring out the reasons for the fall in profit.

Answer: Sales price variance Rs. 21.60(F); Material price variance Rs. 11.88(A); Variable overhead expenditure variance Rs. 2.18(A); variable overhead efficiency variance Rs. 3.62(A); Fixed overhead expenditure variance Rs. 1.68(A); Fixed overhead volume variable R. 1.82(A), (all Rs. In lakhs).

Question 57.

Following is the standard cost card of a component:

Materials	2 Units at Rs. 15	Rs. 30
-----------	-------------------	--------

Labour	3 Hours at Rs. 20	Rs. 60
Total overheads	3 Hours at Rs. 10	Rs. 30

During a particular month 10,000 units of the component were produced and the same was found to be at 60% capacity of the budget. In preparing the variance report for the month, the cost accountant gathered the following information:

Labour	Rs. 6,50,000
Variable overheads	Rs. 2,00,000
Fixed overheads	Rs. 3,00,000
Material price variance	Rs. 70,000 (A)
Material cost variance	Rs. 50,000 (A)
Labour rate variance	Rs. 50,000 (F)
Fixed overhead expenditure variance	Rs. 50,000 (A)

You are required to prepare from the above details:

- (1) Actual material incurred
- (2) Standard cost of materials actually consumed

Chapter – 12

Budgetary Control

Question : 1

Manufacturers Ltd. produce three products from three basic raw materials in three departments. The company operates a budgetary control system and values its stock of finished goods on a total cost basis. From the following data, you are required to produce for the month of July 1986 the following budgets:

- (a) Production
- (b) Material usage
- (c) Purchases
- (d) Profit and Loss Account for each product and in total.

Budgeted data for July 1986

Products

	A	B	C
Sales	Rs. 15,00,000	Rs. 10,80,000	Rs. 16,80,000
Stock of finished products at July 1, 1986 in units	3,000	2,000	2,500

s

Departments

	I	II	III
Production overhead	Rs. 2,39,000	Rs. 2,01,300	Rs. 3,91,200
Direct labour hours	47,800	67,100	65,200

Direct material

	M1	M2	M3
Stock at July 1, 1986 in units	24,500	20,500	17,500

The company is introducing a new system of inventory control which should reduce stocks. The forecast is that stocks as at 31st July 1986 will be reduced as follows: Raw materials by 10% and finished products by 20%.

Fixed production overhead is absorbed on a direct labour hour basis. It is expected that there will be no work-in-progress at the beginning or end of the month.

Administration cost is absorbed by products at a rate of 20% of production cost and selling and distribution costs are absorbed by products at a rate of 40% of production cost.

Profit is budgeted as a percentage of total cost as follows:

Product A 25% Product B 12.5% and products C 16.33%.

Standard cost data, per unit of product:

	Price per unit	A	B	C
Direct material :	Rs.	Units	Units	Units
M1	2.00	5	-	12
M2	4.00	-	10	9
M3	1.00	5	5	-
	Rate per hour			
Direct Wages:	Rs.	Hours	Hours	Hours
Department I	2.50	4	2	2
Department II	2.00	6	2	3
Department III	1.50	2	4	6
		Rs.	Rs.	Rs.
Other variable costs		10	20	15

Question : 2

ACE Ltd. manufactures three products A, C and E in two production departments F and G, in each of which are employed two grades of labour. The cost accountant is preparing the annual budgets for the next year and he has asked you to prepare using the data given below:

- The production budget in units for products A, C and E.
- The direct wages budget for departments F and G with the labour costs of products A, C and E and total shown separately.

	Product A (Rs. '000)	Product C (Rs. '000)	Product E (Rs. '000)
Finished stocks :			
Budgeted stocks are			
1st Jan. – next year	720	540	1,800
31st Dec. – next year	600	570	1,000
All stocks are valued at standard cost per unit	Rs. 24	Rs. 15	Rs. 20
Standard profit :			
Calculate as a percentage of selling price	20%	25%	16.33%

	Total (Rs. '000)	Product A (Rs. '000)	Product C (Rs. '000)	Product E (Rs. '000)
Budgeted sales are:				
South	6,600	1,200	1,800	3,600
West	5,100	1,500	1,200	2,400
North	6,380	1,500	800	4,080
	18,080	4,200	3,800	10,080
Normal Loss in production		10%	20%	5%
Standard labour times per unit and standard rates per hour :	Rate	Product A	Product C	Product E
	Rs.	Hours Per units	Hours Per unit	Hours Per unit

Department F :				
Grade I	1.80	2.0	3.0	1.0
Grade 2	1.60	1.58	2.0	1.5
Department G:				
Grade 1	2.00	3.0	1.0	1.0
Grade 2	1.80	2.0	1.5	2.5

Question : 3

S.G. Ltd. manufactures two products A and B. the summarized balance sheet of the company as at 30th September, 1988 is as under:

	Rs.	Rs.
Share capital	12,00,000	
Retained income	96,000	12,96,000
Represented by:		
Fixed Assets	12,00,000	
Provision for Depreciation	3,00,000	9,00,000
Inventories :		
Raw materials	1,14,000	
Finished goods	2,40,000	3,54,000
Debtors		90,000
Bank/cash		60,000
		14,04,000
Less:- Creditors	48,000	
Provision for taxation	60,000	1,08,000
		12,96,000

The following information has been furnished to you for the preparation of the budget for the year ending 30th September, 1986:

- (i) **Sales forecast:**
Product A 24,000 units at Rs. 30 per unit
Product B 15,000 units at Rs. 40 per unit.

- (ii) **Raw material :**

Material X @ Rs. 3 per kg.
Material Y @ Rs. 1 per kg.

Products	
A	B
2 kgs.	4 kgs.
1 kg.	2 kgs.

- (iii) **Direct labour :**
Dept. P: 2 Hrs @ Rs. 1 per hour for A

1 Hr. @ Rs. 2 per hour for B
 Dept Q: 1 Hr. @ Rs. 3 per hour for A
 1 Hr. @ Rs. 3 per hour for B

(iv) **Overheads :**

	Dept. P Rs.	Dept. Q Rs.
Fixed overheads per annum:		
Depreciation	48,000	12,000
Others	96,000	30,000
Variable overheads per hour	0.50	1.50

(v) **Inventories :**

(a) raw materials:	
Opening stock	
X	36,000 kgs.
Y	6,000 kgs.
Closing stock	
X	48,000
Y	12,000
(b) finished goods :	
Opening stock	
A	600 units
B	6,000 units
Closing stock	
A	6,600
B	3,000

(vi) Selling, Distribution and Administration expenses are estimated at Rs. 1,80,900 per annum.

(vii) The cost of raw material purchases, direct wages, factory overheads, selling, distribution and administration overheads of the year will be met in full in cash during the year. The estimated position of debtors and creditors as on 30th September, 1989 is Rs. 1,50,000 and Rs. 48,000 respectively. Income tax provision standing at the beginning of the year will be paid during the year. Rate of income tax is 50%. An equipment purchased at Rs. 1,20,000 will be paid during the year.

You are required to prepare for the year ending 30th September, 1989:

- Cost of goods sold budget
- Cash budget
- Projected Balance Sheet as at 30th September, 1989 in the same format as given in the question.

The detailed working for each of the above should be shown.

In its round of talks with the representatives of the Trade Union, Amicable Relations Ltd. is faced with a Union demand for an increase of 15% on the hourly wage rates, in response to a management offer of 5%.

The management is most reluctant to agree to such a demand but is willing to consider making an increased offer provided that it influences productivity. The suggestion to offer 5% on basic hourly rates plus Rs. 0.15 for every standard hour of output produced. If this is agreed to, it is expected that production would increase by 10% within the budgeted hours (normal factory capacity).

In order to sell the increased output, it would become necessary to effect a reduction of 2.5% in the selling price.

The draft budget for the forthcoming year, excluding the wages and sales increase, are:

		Rs. In lakhs
Sales (15,00,000 units)		60
Direct material	12	
Direct wages	18	
Variable production overhead	3	
Fixed production overhead	10	
Variable sales overhead (5% of turnover)	3	
Fixed sales overhead	6	
Variable distribution overhead	1	
Fixed distribution overhead	1	
Fixed administration overhead	2	
		56
Profit		4

You are required to work out the alterations in the budget:

- If the trade union demand is accepted by management.
- If the management's proposal of wage increase linked to productivity is accepted by the trade union.

Also work out the minimum output necessary for the management's proposal to be made rewarding to the labour force than a 15% wage increase.

Question : 5

PYE Led. Produces and markets a very popular product call P. The company is interested in presenting its budget for the second quarter of 1993.

The following information is made available for this purpose:

- It expects to sell 50,000 bags of p during the second quarter of 1993 at the selling price of Rs. 9 per bag.
- Each bad of P requires 2.5 kgs. Of raw material call Q and 7.5 kgs. Of raw material called R.
- Stock levels are planned as follows:

	Beginning of quarter	End of quarter
Finished bags of P (Nos.)	15,000	11,000
Raw-material Q (kgs.)	32,000	26,000

Raw-material Rs (kgs.)	57,000	47,000
Empty bag (Nos.)	37,000	28,000

- (d) Q costs Rs. 1.20 per kg., R costs 20 paise per kg. and empty bad costs 80 paise each.
- (e) It requires 9 minutes of direct labour time of produce and fill one bad of P. labour cost is Rs. 5 per hour.
- (f) Variable manufacturing costs are Rs. 0.45 per bag. Fixed manufacturing costs Rs. 30,000 per quarter.
- (g) Variable selling and administration expenses are 5% of sales and fixed administration and selling expenses are Rs. 25,000 per quarter.

You are required to:

- Prepare a production budget for the said quarter.
- Prepare a raw materials purchase budget for Q, R, and empty bags for the said quarter in quantity as well as in rupees.
- Compute the budgeted variable cost to produce one bag of p.
- Prepare a statement of budgeted net income for the said quarter and show both per unit and total cost data.

Question : 6

X Ltd., produces and markets three products – Chairs, Tables and Benches. The company is interested in presenting its budget for the next quarter ending 31st March, 1994. It expects to sell 4,200 chairs, 800 tables and 500 benches during the said period at the selling price of Rs. 50, Rs. 85, and Rs. 158 per unit respectively. The following information is made available for the purpose:

- (a) Material and labour requirements:

	Chairs	Tables	Benches
Timber per unit (in cu.ft.)	0.50	1.2	2.5
Upholstery per unit (in sq.yds)	0.25	-	-
Carpenter's time (minutes per unit)	45	60	75
Fixer and finisher's time (minutes per unit)	15	15	30

The costs Rs. 50 per cu.ft. and upholstery costs Rs. 20 per sq.yd. Fixing and finishing material costs 5% of the cost of timber and upholstery. Carpenter gets Rs. 6 per hour while the fixer and finisher get Rs. 4.80 per hour.

- (b) Inventory levels planned:

	Timber (cu.ft.)	Upholstery (sq.yd.)	Chairs (nos.)	Tables (nos.)	Benches (nos.)
Opening	600	400	400	100	50
Closing	650	260	200	300	50

- (c) Fixed overheads would be Rs. 8,000 per month.

You are required to:

- (a) Prepare a production budget showing quantities to be manufactured.

- (b) Prepare a raw materials purchase budget in quantities as well as in rupees
- (c) Draw a direct wage cost budget.
- (d) Present a statement showing variable cost of manufacture per unit of all three products.
- (e) Find out the budgeted net income for the said quarter.

Question : 8

A factory manufacturing three products, involving more than one labour operation for each product, has the following direct labour requirements, for the products:

Operation.	Direct labour hours per unit (in minutes)		
	Product 1	Product 2	Product 3
I	18	42	30
II	-	12	24
III	9	6	-

The factory works 8 hours per day, 6 days in a week. Each budget quarter has 13 weeks and in terms of leave holidays and other cause, 124 hours are lost in each quarter.

Operations I, II and III have the budgeted hourly rates for workers at Rs. 16, Rs. 20 and Rs. 24 respectively.

The budgeted sales of the products during the quarter are

Product 1	9,000 units
Product 2	15,000 units
Product 3	12,000 units

There were operating stocks of 5,000 units of product 2 and 4,000 units of product 3 and it is proposed to have closing stock at the end of the budget quarter as follows:

Product 1	1,000 units
Product 2	2,000 units

Prepare a man-power budget for the quarter, showing for each operation:

- (a) Direct labour hours
- (b) Direct labour cost, and
- (c) Number of workers.

Question : 9

Sterling Enterprise has prepared a draft budget for the next year as follows:

		10,000 units
Sales price per unit		Rs. 30
Variable costs per unit:	Rs.	
Direct material	8	
Direct labour (2 hours * Rs. 3)	6	
Variable overhead (2 hours * Re. 0.50)	1	15
Contribution per unit		15
Budgeted contribution		1,50,000
Budgeted fixed costs		1,40,000
Budgeted profit		10,000

The board of director are dissatisfied with the budget, and ask a working party to come up with an alternate budget with a higher profit figures.

The working party report back with the following suggestions with will lead to a budgeted profit of Rs. 25,000. The company should spend Rs., 28,500 on advertising ,and put the sales price up to Rs. 32 per unit. It is expected that sales volume would also rise, in spite of the price increase, to 12,000 units. In order to achieve the extra production capacity, however, the work force must be able to reduce the time taken to make each unit of the product. It is proposed to offer a pay and productivity deal, in which the wage rate per hour is increased to Rs. 4. The hourly rate for variable overhead will be unaffected.

Prepare a revised budget giving effect to the above suggestions.

Question : 10

On 30th September, 1990 the Balance Sheet of Melodies Pvt. Ltd., retailers of musical instruments, was as under:

	Rs.		Rs.
Ordinary shares of Rs. 10 each fully paid	20,000	Equipment (at cost)	20,000
Reserve and surplus	10,000	Less:- Depreciation	5,000
			15,000
Trade creditor	40,000	Stock	20,000
Proposed dividend	15,000	Trade debtors	15,000

		Balance at Bank	35,000
	85,000		85,000

The company is developing a system of forward planning, and on 1st October, 1990 it supplies the following information:

	Credit sales	Cash sales	Credit purchases
	Rs.	Rs.	Rs.
September 1990 (actual)	15,000	14,000	40,000
October 1990 (budget)	18,000	5,000	23,000
November 1990 (budget)	20,000	6,000	27,000
December 1990 (budget)	25,000	8,000	26,000

All trade debtors are allowed one month's credit and are expected to settle promptly. All trade creditors are paid in the month following delivery.

On 1st October 1990, all the equipment was replaced at a cost of Rs. 30,000. Rs. 14,000 was allowed in exchange for the old equipment and a net payment of Rs. 16,000 was made. Depreciation is to be provided at the rate of 10% per annum.

The proposed dividend will be paid in December 1990.

The following expenses will be paid:

Wages Rs. 3,000 per month

Administration Rs. 1,500 per month

Rent Rs. 3,600 for the year to 30th September 1991 (to be paid in October 1990).

The gross profit percentage on sales is estimated at 25%

You are required:

- To prepare a cash budget for the months of October, November and December.
- To prepare income statement for the three months ended 31st December, 1990.

Question : 11

K Ltd. manufactures and sells a range of sport goods. Management is considering a proposal for an advertising campaign which would cost the company Rs. 3, 00,000. The marketing department has put forward the following two alternative sales budgets for the following year:

	Product ('000 units)			
	A	B	C	D
Budget-1- Without Advertising	216	336	312	180
Budget-2- With Advertising	240	372	342	198

Selling prices and variable production costs are budgeted as follows:

	Products (Rs. Per unit)			
	A	B	C	D
Selling prices	11.94	14.34	25.54	23.94
Variable production costs:				
Direct material	5.04	6.60	15.24	12.48
Direct labour	2.04	2.04	3.36	3.18
Variable overheads	0.72	0.72	1.20	1.08

Other data:

- (i) The variable overheads are absorbed on a machine hour basis at a rate of Rs. 1.20 per machine hour
- (ii) Fixed overheads total Rs. 30,84,000 per annum.
- (iii) Production capacity during the budget period 8,15,000 machine hours
- (iv) Product A and C could be bought in at Rs. 10.68 per unit and Rs. 24 per unit respectively.

Required:

- (i) Determine whether investment in the advertising campaign would be worthwhile and how production facilities would be best utilized.
- (ii) Explain the assumptions and reasoning behind your advice.

Question : 12

S.V. Ltd. manufactures a single product. The selling price of the product is Rs. 95 per unit. The following are the results obtained by the company during the last two quarter.

	Quarter I	Quarter II
Sales units	5,100	4,800
Production units	5,500	4,500
	Rs.	Rs.
Direct material		
A	66,000	54,000
B	55,000	45,000
Manufacturing wages	1,56,750	1,38,000
Factory overheads	86,000	83,000
Selling overheads	79,000	73,000

The company estimates its sales for the next quarter to range between 5,500 units and 6,500 units, the most likely volume being 6,000 units. The manufacturing programme will match with the sales quantity such that no increase in inventory of finished goods is contemplated in the next quarter. The following price and cost changes will, however, apply to the next quarter:

- The price of direct material B will increase by 10%. There will be no change in the price of direct material A.

- The wages rates will go up by 8%. If the production volume increase beyond 5,500 units, overtime premium of 50% is payable on the increased volume due to overtime working to be done by the variable labour complement.
- The fixed factory and selling expenses will increase by 20% and 25% respectively.
- A discount in the selling price of 2% is allowed on all sales made at 6,500 units level of output. The selling price, however, will remain unaltered, if the volume of output is below 6,500 units.

While operating at a volume of output of 6,500 units in the next quarter, the company intends to quote for an additional volume of 2,000 units to be supplied to a Government department for its captive consumption. The working capital requirement of this order is estimated at 80% of the sales value of the Government order. The company desires a return of 20% on the capital employed in respect of this order.

Required:

- Prepare a flexible budget for the next quarter at 5,500 and 6,000 and 6,500 unit levels and determine the profit at the respective volumes.
- Calculate the lowest price per unit to be quoted in respect of the government order for 2,000 units.

Question : 13

Jolly Fabrics manufactures quality napkins at its unit in Tripura. The unit has capacity of 60,000 napkins per month. Present monthly production for April is 40,000 napkins. Costs incurred for production are as below: (per unit).

Direct material	Rs. 06	No fixed cost
Direct labour	Rs. 02	Fixed cost 75%
Manufacturing overhead	Rs. 04	Variable 25%
Total	Rs. 12	

The marketing costs per unit is Rs. 7 (Rs. 5 is variable). Marketing costs include distribution costs and customer service costs. Present selling price is Rs. 22.50 per unit.

Due to a strike at its existing napkin supplier, a hotel group has offered to buy 10,000 napkins from jolly fabrics @ Rs. 11 per napkin for the month of June. No further sales to the hotel are anticipated. Fixed manufacturing costs and marketing costs are tied to the 60,000 napkins. The acceptance of the special order is not expected to affect the selling price to regular customers.

No marketing costs involved in special order.

Prepare:-

- Budgeted incomes statement for June.
- Actual income statement under absorption costing for April.
- Should Jolly Fabrics accept the special order from the hotel or not?

Question : 14

A Company manufactures three products namely A, B and C. the current pattern of sales of A, B and C is in the ratio of 8:2:1 respectively. The relevant data are as under:

Products	A	B	C
Selling price per unit Rs.	130	230	417
Raw materials per unit Kg.	0.50	1.2	2.5
Direct material per units Kg.	0.25	-	-
Skilled labour hours/unit	4	6	8
Semi-skilled labour hours per unit	2	2	3
Variable overheads Rs. Per unit	20	40	80

The prices of raw materials and direct materials respectively are Rs. 100 and Rs. 40 per kg. the wages rates of skilled and semi-skilled labour respectively are Rs. 6 and Rs. 5. Each operator works 8 hours a day for 25 days in a month.

The position of inventories are as under:

	Raw Materials Kg.	Direct Materials Kg.	A Units	B Units	C Units
Opening	600	400	400	100	50
Closing	650	260	200	300	40

The fixed overheads amount to Rs. 2,00,000 per month and the company desires a profit of Rs. 1,20,000 per month.

You are required to prepare the following for a month:

- Sales budget in quantity and value.
- Production budget showing the quantity to be manufactured.
- Purchase budget showing the quantity and value.
- Direct labour budget showing the number of workers and wages.

Question : 15

Kitchen King company makes a high – end kitchen range hood "Maharaja". The company presents the data for the year 2003 and 2004:

Particular	2003	2004
1. Units of Maharaja produced and sold	40,000	42,000
2. Selling price per unit in Rs.	1,000	1,100
3. Total direct material (Square feet)	1,20,000	1,23,000
4. Direct material cost per square feet in Rs.	100	110
5. Manufacturing capacity (in units)	50,000	50,000
6. Total conversion cost in Rs.	1,00,00,000	1,10,00,000

7. Conversion cost per unit of capacity (6)/(5)	200	220
8. Selling and customer service capacity	300 customer	290 customer
9. Total selling and customer service cost in Rs.	72,00,000	72,50,000
10. Cost per customer of selling and customer service capacity (9)/(8)	24,000	25,000

Kitchen King produce no defective units, but it reduces direct material used per unit in 2004. Conversion cost in each year depends on production capacity defined in terms of Maharaja units that can be produced. Selling and customer service cost depends on the number of customers that the selling and service functions are designed to support. Kitchen King has 230 customers in 2003 and 250 customers in 2004.

You are required:

1. Describe briefly key elements that would include in kitchen king's Balance Score Card.
2. Calculate the Growth, Price-recovery and productivity component that explain the change in operating income from 2003 to 2004.

Answer:

The change in operating income from 2003 to 2004 is analysed as follows:

(Amount in 000 Rs.)

	2003	Growth component	Price recovery	Cost effect of productivity component	2004
Revenue	40000	2000(F)	4200(F)	-----	46200
Cost	29200	600(A)	2560(A)	580(F)	31780
Operating income	10800	1400(F)	1640(F)	580(F)	14420

Question : 16

A company is engaged in manufacturing two products X and Y . product X uses one unit of component P and two units of component Q. Product Y uses two units of component P, one unit of component Q and two units of component R. Component R which is assembled in the factory uses one unit of component Q.

Component P and Q are purchased from the market. The company has prepared the following forecast of sales and inventory for the next year:

	Product X	Product Y
Sales (in units)	80,000	1,50,000
At the end of the years	10,000	20,000
At the beginning of the year	30,000	50,000

The production of both the products and the assembling of the component R will be spared out uniformly throughout the year. The company at present orders its inventory of P and W in quantities

equivalent to 3 months production. The company has compiled the following data related to two components:

	P	Q
Price per unit (Rs.)	20	8
Order placing cost per order (Rs.)	1,500	1,500
Carrying cost per annum	20%	20%

Required:

- Prepare a budget of production and requirement of components during next year.
- Suggest the optimal order quantity of components P and Q.

Answer:

(a) Production : X – 60000 units, Y – 120000 units : (b) P – 15000 components, Q – 30,000 components.

Question : 17

A manufacturer produces three products whose cost data are as follows:-

	X	Y	Z
Direct material (Rs/Unit)	32.00	76.00	58.50
Direct labour :			
Dept. Rate/hours (Rs.)	Hours	Hours	Hours
1 2.50	18	10	20
2 3.00	5	4	7
3 2.00	10	5	20
Variable overheads (Rs.)	8	4.50	10.50

Fixed overheads Rs. 4,00,000 per annum.

The budget was prepared at a time, when market was sluggish. The budgeted quantities and selling prices are as under:

Product	Budgeted quantity	Selling price/unit
	Units	(Rs.)
X	19,500	135
Y	15,600	140
Z	15,600	200

Later, the market improved and the sales quantities could be increased by 20 percent for product X and 25 percent each for products Y and Z. the sales manager confirmed that the increased sales could be achieved at the prices originally budgeted. The production manager stated that the output could not be increased beyond the budgeted level due to the limitation of Direct labour hours in department 2.

Required: prepare a Statement of budgeted profitability.

Answer: Profit Rs. 3,99,500

EDUCARE

Chapter-13

Transfer Pricing

Question: 1

What is meant by Incremental revenue?

A company has two divisions, Division A and Division B. Division A has a Budget of selling 2,00,000 nos. of a particular component 'x' to fetch a return of 20% on the average assets employed. The following particulars of Division A are also known:

Fixed overhead	Rs. 5 lakhs
Variable costs	Rs. 1 per unit
Average assets:	
Sundry debtors	Rs. 2,00,000
Inventories	Rs. 5,00,000
Plant and Equipments	Rs. 5,00,000

However there is constraint in marketing and only 1,50,000 units of the component 'x' can be directly sold to the market at the proposed price.

It has been gathered that the balance 50,000 units of component 'x' can be taken up by Division B. Division A wants a price of Rs. 4 per unit of x but Division B is prepared to pay Rs. 2 per unit of x

Division A has another option on hand, which is to produce only 1,50,000 units of component x . This will reduce the holding of assets by Rs. 2 lakhs and fixed overhead by Rs. 25,000.

You are required to advise the most profitable course of action for Division A.

Question: 2

AB Limited Manufactures from, carpets and upholstery in its three divisions. Its operating statement for 1995-1996 showing the performance of these divisions drawn for the use of management is reproduced below:

	Manufacturing Divisions			Total
	Foam	Carpets	Upholstery	
Sales revenue	1,600 (A)	1,200	1,200	4,000
Manufacturing costs:				
Variable	1,200	700	680	2,580
Fixed (Traceable)	-	100	20	120
	1200	800	700	2,700
Gross profit	400	400	500	1,300
Expenses:				
Administration	134	116	172	422
Selling	202	210	232	644
	336	326	404	1,066
Net Income	64	74	96	234
Division's Ranking	3 rd	2 nd	1 st	

- (a) Sales include foam transferred to the Upholstery Division at its manufacturing cost Rs. 2,00,000
- (b) Common expenses of Rs. 1,30,000 and Rs. 1,00,000 on account of administration and selling respectively stand apportioned to these divisions at 10% of Gross Profit in case of administration and 2.5% of sales in case of selling expenses. Rest of Rs. 8,36,000 of the expenses are traceable to respective divisions.

The manager of the Foam Division is not satisfied with the above approach of presenting operating performance. In his opinion his division is best among all the divisions. He requests the management for preparation of revised operating statement using contribution approach and showing internal transfer at market price.

You are required to:

- (a) Draw the revised operating statement using contribution approach and pricing the internal transfer at market price.
- (b) Compute relevant ratios to show comparative profitability of these divisions and rank them in the light of your answer at (a) above. Further, offer your comments on the contention of the Manager of Foam Division.
- (c) State why the contribution approach and pricing of internal transfer at market price are more appropriate in realistic assessment of the performance of various divisions.

Question: 3

Betagro Limited which has a system of assessment of divisional performance on the basis of Residual Income has two divisions- Alfa and Beta. Alfa has annual capacity to manufacture 15 lakhs nos. of a special component which it sells to outside customers; but has idle capacity. The budgeted residual income of Beta is Rs. 120 lakhs while that of Alfa is Rs. 100 lakhs. Other relevant details extracted from the Budget of Alfa for the year are:

Sales(to outside customers)	12 lakhs units @ Rs. 180 per unit.
Variable cost per unit	Rs. 160
Divisional fixed cost	Rs. 80 lakhs
Capital employed	Rs. 750 lakhs
Cost of capital	12%

Beta has just received a special order for which it requires components similar to the ones made by Alfa. Fully aware of Alfa's unutilized capacity, Beta has asked Alfa to quote for manufacture and supply of 3,00,000 numbers of the components with a slight modification during final processing. Alfa and Beta agree that this will involve an extra variable cost of Rs. 5 per unit.

- (i) Calculate the transfer price which Alfa should quote to Beta to achieve its budgeted residual income.
- (ii) Indicate the circumstances in which the proposed transfer price may result in a sub-optimal decision for the Betagro group as a whole.

Question: 4

M/s Foamstar have two divisions Foams and Star. Foam manufactures an intermediate product for which there is no intermediate external market. Star incorporates this intermediate product into the final product which it sells. One unit of the intermediate product is used in the production of the

final product. The expected units of the final product which Star division estimates it can sell at various selling price are as follows:

Net selling price	Quantity sold
Rs.	Units
1,000	10,000
900	20,000
800	30,000
700	40,000
600	50,000
500	60,000

The costs of each division are as follows:

	Foam	Star
Variable cost per unit (Rs.)	110	70
Fixed cost per annum (Rs.)	60,00,000	90,00,000

The transfer price is Rs. 350 for the intermediate product and is determined on a full cost plus basis. You are required to:

- Prepare profit statement of each division and the company as a whole for the various selling prices.
- State which selling price maximize profit for the star division and the company as a whole and comment on why the latter selling price is not selected by Star Division.
- State which transfer pricing policy will maximize the company's profit under a divisional organization.

Question: 5

A Limited produces P by its two divisions, X and Y. P is first processed in X and then in Y, X and Y are treated as profit centers. The cost-volume profit structure is as given below:

Output	X	T	Profit
Units	Costs (Rs.)	Net revenue	
1,000	900	4,000	3,100
1,100	1,000	4,300	3,300
1,200	1,120	4,540	3,420
1,300	1,250	4,730	3,480
1,400	1,400	4,900	3,500
1,500	1,580	5,030	3,450
1,600	1,800	5,110	3,310

Note Net revenue of Y means the sale proceeds minus cost incurred in Y. These costs do not include the price of transferred material chargeable by X.

Required:

- Discuss the problem.
- Fix and explain the optimum transfer price of A Ltd.

Question: 6

P limited has two divisions, S and T. S transfers all its output to T. which finishes the work. Costs and revenues at various levels of capacity are as follows:

Output	S Cost	T. Net revenues (i.e. revenue minus costs incurred in T)	Profit
Units	Rs.	Rs.	Rs.
600	600	2,950	2,350
700	700	3,250	2,550
800	840	3,530	2,690
900	1,000	3,780	2,780
1,000	1,200	4,000	2,800
1,100	1,450	4,200	2,750
1,200	1,800	4,350	2,550

Company profits are maximized at Rs. 2,800 with output of 1,000 units. If P limited wish to select a transfer price in order to establish S and T as profit centres, what transfer price would motivate the managers of S and T together to produce 1,000 units, no more and no less?

P Limited wants that the transfer price should be set a Rs. 2.10 per unit. Comment on this proposal

Question: 7

Two divisions of a company, both manufacturing the same product with same grade and quality are located at two distant place A and B. The annual output of the division at A is 6,000 tonnes (80% capacity) and that of division B is 7,500 tonnes (60% capacity). The basic raw material used is available locally at both the places, but limited to 3,000 tonnes per annum @ Rs. 900 per tonne at division A and 8,000 tonnes per annum @ Rs. 1,000 per tonne at division B. any additional requirement will have to be purchased from other markets at a rate of Rs. 1,150 per tone F.O.R. at either division. Variable costs at each division are constant per tone of output. For every 100 tonnes of output, 80 tonnes of basic raw material is required.

The details of other annual variable and fixed costs of the divisions are required:

	Division A	Division B
	Rs. In lakhs	Rs. In lakhs
Other variable costs (excluding raw material)	78.00	96.00
Fixed cost	50.00	60.00

You are required to

- Determine for each tone of output, the raw material cost, other variable cost and total cost, in respect of each division give details of working;
- Determine the quantity of production that could be transferred between the two divisions, if the company desires to fully utilize the available local supplies of raw material to reduce cost of production, keeping the total production of both the divisions put together, the same as at present;
- Determine the revised schedule of production at both the divisions based on the answer to (b) above and identify the cost saving.

Question: 8

A company has two divisions viz. LD and KD. LD operates at full capacity and KD operates at 50% capacity.

LD produces two products, LX and LY using the same labour forces for each product. The direct wage rate per production hour is Rs. 5. During the next year, its budgeted capacity of 42,000 direct labour hours involves a commitment to sell 6,000 kg. of LY. The balance capacity will be used for the production of LX

Cost data are:

	LX	LY
	Rs./kg.	Rs./kg.
Direct material	36	28
Direct wages	30	20

The company's overheads amount to Rs. 7,56,000 per annum relating to LX and LY in proportion to direct wages. At full capacity Rs. 4,20,000 of this overhead is variable. LD price its products with 50% mark-up on its total costs.

KD wishes to buy 2,000 kgs. of LX from LD for being processed into KX to be sold at Rs. 300 per kg. The processing materials and wage cost are Rs. 30 per kg. and the variable overhead amount to Rs. 4 per kg. The fixed costs amount to Rs. 1, 00,000 per annum.

Prepare a report showing the profitability of LD and KD and the company as a whole of each of the following transfer price methods:

- (i) LD transfer LX at a price applicable to outside customers on the basis of total cost.
- (ii) LD transfers LX at a price based on total costs less credit for selling and distribution expenses of Rs. 4 per kg. which will not be incurred in respect of the sale of KD.
- (iii) LD transfer LX at a price based on marginal cost as reduced by Rs. 4 per kg. of selling and distribution expenses.
- (iv) LD manufactures the quantity of LX required by KD by employing overtime payable at double the normal wage rate and transfers at marginal cost less Rs. 4 per kg. being selling and distribution costs not incurred in respect of sale to KD. LD sells the entire regular production to outside customers at the usual price.

Question: 9

Fastners Limited is having production shop reckoned as cost centres. Each shop charges other shops for material supplied and services rendered.

The shops are motivated through goal congruence, autonomy and management efforts. Eastner Limited is having a welding shop and painting shop. The welding shop welds annually 75,000 purchased items with other 1,50,000 shop made parts into 12,000 assemblies. The assemblies are having total cost of Rs. 9.50 each and are sold in market at Rs. 12 per assembly. Out of the total production, 80% is diverted to painting shop at the same price ruling in the market. Welding shop incur a fixed cost of Rs. 25,000 per annum. The painting shop is having fixed costs of Rs. 30,000 and its cost of painting including transfer price from welding shop comes to Rs. 20 per unit. This shop sells all units transferred to it by welding shop at Rs. 25 per assembly.

You are required to:

- (a) Find out profit of individual cost centre and overall profitability of the concern.

- (b) Recommended course of action if painting shop wishes to purchase its full requirement (at market price of Rs 10 per assembly) either from open market or from welding shop at market price of Rs. 10 per assembly.

Give reasons for you recommendations.

Question: 10

Division A is a profit centre which produces three products X, Y and Z. Each product has an external market.

	X	Y	Z
External market price per unit	Rs. 48	Rs. 46	Rs. 40
Variable cost of production in division A	Rs. 33	Rs. 24	Rs. 28
Labour hours required per unit in division A	3	4	2

Product Y can be transferred to Division B, but the maximum quantity that might be required for transfer is 300 units of Y

	X	Y	Z
The maximum external sales are	800 units	500 units	300 units.

Instead of receiving transfers of product Y from Division A. Division B could buy similar product in the open market at a slightly cheaper price of Rs. 45 per unit.

What should the transfer price be for each unit for 300 units of Y, if the total labour hour available in division A are:

- (a) 3800 hours (b) 5600 hours.

Question: 11

A company is organized into two large divisions. Division A produces a component which is used by division B in making a final product. The final product is sold Rs. 400 each. Division A has a capacity to produce 2,000 units and the entire quantity can be purchased by division B.

Division A informed that due to installation of new machines, its depreciation cost had gone up and hence wanted to increase the price of the component to be supplied to Division B to Rs. 220.

Division B, however can buy the component from the outside market at Rs. 200 each. The variable costs of division A is Rs. 190 and fixed cost Rs. 20 per component. The variable cost of Division B in manufacturing the final product by using the component is Rs. 150 (excluding the component cost).

Present statement indicating the position of each Division and the company as a whole taking each of the following situations separately:

- If there are no alternative uses for the production facilities of A, will the company benefit if Division B buys from outside suppliers at Rs. 200 per component?
- If internal facilities of A are not otherwise idle and the alternative use of the facilities will give an annual cash operating saving Rs. 30,000 to Division A, should Division B purchase the component from outside suppliers?

- (iii) If there are no alternative uses for the production facilities of Division A and the selling price for the component in the outside market drops by Rs. 15, should division B purchased from outside suppliers?
- (iv) What transfer price would you fix for the component in each of the above three circumstance?

Question: 12

A large company is organized into several manufacturing divisions. The policy of the company is to allow the Divisional Managers to choose their sources of supply and when buying from or selling to sister divisions, to negotiate the prices just as they will for outside purchase or sale.

Division X buys all of its requirement of its main raw material R from Division Y. The full manufacturing cost of R for Division Y is Rs. 88 per kg. at normal volume.

Till recently, Division Y was willing to supply Rs to Division X at a transfer price Rs. 80 per kg. The incremental cost of R for division Y is Rs. 76 per kg. since division y is now operating at it's full capacity, it is unable to meet the outside customers' demand for R at its market price of Rs. 100 per kg. Division Y, therefore, threatened to cut off suppliers to Division X unless the latter agrees to pay the market price for R.

Division X is resisting the pressure because its budget based on the consumption of 1,00,000 kg per month at a price of Rs. 80 per kg is expected to yield a profit of Rs. 25,00,000 per month and so a price increase to Rs. 100 per kg. will bring the Division X close to break-even-point.

Division X has even found an outside sources for a substitute material at a price of Rs. 95 per kg although the substitute material is lightly different from R, it would meet the needs of Division X. alternatively, Division X is prepared to pay Division Y even the manufacturing cost of Rs. 88 per kg.

Required:

- (i) Using each of the transfer price of Rs. 80, Rs. 88, Rs. 95 and Rs. 100, show with supporting calculation, the financial results as projected by the:
 - (a) Manager of Division X; (b) Manager of Division Y; (c) Company
- (ii) Comment on the effect of each transfer price on the performance of the managers of Division X and Division Y
- (iii) If you were to make a decision in the matter without regard to the views of the individual Divisional Managers, were should Division X obtain its materials from and at what price.

Question: 13

Companies GP, GR and GS and GT are members of a group. GP wishes to buy an electronic control system for its factory and in accordance with group policy, must obtain quotations from companies inside and outside the group.

From outside of the group the following quotations are received:

Company A quoted Rs. 33,200.

Company B quoted Rs. 35,000 but would buy a special unit from GS for Rs. 13,000. To make this unit, however, GS would need to buy parts from GR at a price of Rs. 7,500.

The inside quotation was from GS whose price was Rs. 48,000. This would require GS buyi9ng parts from GR at a price of Rs. 8,000 and units from GT at a price of Rs. 30,000. However, GT would need to buy parts from GR at a price of Rs. 11,000

Additional data are as follows:

GR is extremely busy with work outside the group and has quoted current market price for all its products.

GS costs of the GP Contracts, including purchase from GR and GT total Rs. 42,000. For the company B contract it expects a profit of 25% on the cost of its own work.

GT prices provide for a 20% profit margin on total costs.

The variable costs of the group companies in respect of the work under consideration are:

GR 20% of selling price.

GS 70% of own cost (excluding purchase from other group companies)

GT 65% of own cost (excluding purchases from other group companies)

You are required. From group point view to recommend with appropriate calculation, whether the contract should be placed with GS or company A or company B.

Question: 14

A company is organized on decentralized lines, with each manufacturing division operating as a separate profit centre. Each division manager has full authority to decide on sale of the division's output to outsiders and to other divisions.

Division C has always purchased its requirements of a component from Division A. But when informed that Division A was increasing its selling price to Rs. 150, the manager of Division C decided to look at outside suppliers.

Division C can buy the component from an outside supplier for Rs. 135. But Division A refuses to lower its price in view of its need to maintain its return on the investment.

The top management has the following information:

C's annual purchase of the component	1,000 units
A's variable costs per unit	Rs. 120
A's fixed cost per unit	Rs. 20

Required:

- (i) Will the company as a whole benefit, if division C bought the component at Rs. 135 from an outside supplier?
- (ii) If A did not produce the material for C. it could use the facilities for other activities resulting in a cash operating savings of Rs. 18,000. Should C then purchase from outside sources?
- (iii) Suppose there is no alternative use of A's facilities and the market price per unit for the component drops by Rs. 20. Should C now buy from outside?

Answer: (i) the company as a whole will not benefit as it will be required to incur an additional cost of Rs. 15,000;(ii) it is advisable that division C should purchase the component from outside sources as the decision will benefit the company by Rs. 3,000; (iii) it is advisable that the division C should buy the component from outside as this decision will benefit the company by Rs. 5,000.

Question : 15

Division Z is a profit centre, which produces four products – A, B, C and D. Each product is sold in the external market also.

Data for the period is as follows:

	A	B	C	D
Market price per unit	Rs. 150	Rs. 146	Rs. 140	Rs. 130
Variable cost of production per unit	Rs. 130	Rs.100	Rs. 90	Rs. 85
Labour hours required per unit	3	4	2	3

Product D can be transferred to division Y, but the maximum quantity that might be required for transfer is 2,500 units of D.

The maximum sales in the external market are:

A	2,800 units
B	2,500 units
C	2,300 units
D	1,600 units

Division y can purchase the same product at a slightly cheaper price of Rs. 125 per unit instead of receiving transfer of product D from division Z.

What should be the transfer price for each unit for 2,500 units of D, if the total labour hours available n division Z are:

- (i) 20,000 hours?
- (ii) 30,000 hours?

Answer: (i) transfer price per unit Rs. 118.34; (ii) transfer price per unit Rs. 99.13

Question : 16

City Instrument Company (CIC) consists of the Semi-conductor Division and the Mini-computer Division, each of which operates as an independent profit centre. Semi-conductor Division employs craftsmen, who produce two different electronic components, the new – high performance super chip and an older product call Okay-chip. These two products have the following cost characteristics:

Super-chip			Okay-chip	
Material	Parts	Rs. 20	Parts	Rs. 10
Labour	2 hours * Rs. 140	280	1/2 hours * Rs. 140	70

Annual Overhead in Semi-conductor Division is Rs. 40,00,000 all fixed. Owing to high skill level necessary for the craftsmen, the semi-conductor division's Capacity is set at 50,000 hours per year.

To date, only one customer has developed a product utilising super-chip, and this customer orders a maximum of 15,000 super-chips per year at a price of Rs. 600 per chip. If CIC cannot meet

his entire demand, the customer curtails his own production. The rest of the semi-conductor's capacity is devoted to Okay-chips, for which there is unlimited demand at Rs. 120 per chip.

The mini-computer Division produces only one product, a process control unit, which requires a complex circuit board imported at a price of Rs. 600. The control unit's costs are :

	Control unit	
Material	Circuit board	Rs. 600
	Other parts	80
Labour	5 hours @ Rs. 100	500

The mini-computer Division is composed of only a small assembly plant and all overhead is fixed at a total of Rs. 8,00,000 per year. The current market price for the control unit is Rs. 1,400 per unit.

A joint research project has just revealed that with minor modifications, a single super-chip could be substituted for the circuit board currently used by the Mini-computer division. The modification would require an extra one hours of labour by Mini-computer's staff, for a total of 6 hours per control unit. Mini-computer has therefore asked semi-conductor division to declare a transfer price at which Semi-conductor division would sell super-chip internally.

Required:

- (i) Mini-computer expects to sell 5,000 control units this year. From the overall view point of CIC, how many super-chips should be transferred to Mini-computer Division to replace circuit boards?
- (ii) If the demand for the control unit is sure to be 5,000 units, but its price is uncertain, what should be the transfer price of super-chip to ensure proper decision? (All other data unchanged.)
- (iii) If demand for the control units rises to 12,000 units at a price of Rs. 1,400 per unit, how many of 12,000 units should be built using super-chip? (All other data unchanged.)

Answer: (i) 5,000 units; (ii) Rs. 460; (iii) 10,000 units.

Question : 17

A company is engaged in the manufacture of edible oil. It has three divisions as under:

- (i) Harvesting oil seeds and transportation thereof to the oil mill.
- (ii) Oil Mill, which processes oil seeds and manufactures edible oil.
- (iii) Marketing division, which packs the edible oil in 2 kg. containers for sale at Rs. 150 each container.

The Oil Mill has a yield of 1,000 kegs of oil from 2,000 kg. of oil seeds during a period. The Marketing

Division has a yield of 500 cans of edible oil of 2 kg. each from every 1,000 kg of oil. The net weight per can is 2 kg of oil. The cost data for each division for the period are as under:

Harvesting division :	
Variable cost per kg of oil seed	Rs. 2.50
Fixed cost per kg of oil seed	Rs. 5.00
Oil Mill Division :	
Variable cost of processed edible oil	Rs. 10.00 per kg.
Fixed cost of processed edible oil	Rs. 7.50 per kg.
Marketing Division :	
Variable cost per can of 2 kg of oil	Rs. 3.75
Fixed cost per can of 2 kg of oil	Rs. 8.75

The Fixed costs are calculated on the basis of the estimated quantity of 2,000 kg of oil seeds harvested, 1,000 kg. of processed oil and 500 cans of edible oil packed by the aforesaid divisions respectively during the period under review.

The other oil mills buy the oil seeds of same quality at Rs. 12.50 per kg in the market. The market price of edible oil processed by the oil mill, if sold without being packed in the marketing division is Rs. 62.50 per kg of oil.

Required:

- (i) Compute the overall profit of the company of harvesting 2,000 kg. of oil seeds processing it into edible oil and selling the same in 2 kg. cans as estimated for the period under review.
- (ii) Compute the transfer prices that will be used for internal transfers from (1) Harvesting Division to Oil Mill Division and (2) from Oil Mill Division to Marketing division under the following pricing methods:
 - (a) Shared contribution in relation to variable costs; and
 - (b) Market price.
- (iii) Which transfer pricing method will each divisional manager prefer to use?

Answer: (i) Rs. 36,250; (ii) (1) Rs. 66,667, (2) Rs. 62,500; (iii) harvesting division manager – market price method, oil mill division manager shared contribution method, marketing division manager- market price method.

Question : 18

CA Final 2002 May

The two manufacturing divisions of a company is organized on profit centre basis. Division X is the only source of a component required by Division Y for their product P. Each unit of P requires one unit of the said component. As the demand of the product is not steady, orders for increased quantities can be obtained by manipulating prices. The manager of Division Y has given the following forecast:

Sales per day (units)	Average price per unit of P (Rs.)
5,000	393.75
10,000	298.50
15,000	247.50
20,000	208.50

25,000	180.00
30,000	150.75

The manufacturing cost (excluding the cost of the component from Division X) of P in Division y is Rs. 14,06,250 on first 5,000 units and Rs. 56.25 per unit in excess of 5,000 units.

Division X incurs a total cost of Rs. 5,62,500 per day for an output up to 5,000 components and the total costs will increase by Rs. 3,75,500 per day for every additional 5,000 components manufactured. The manager of Division X has set the transfer price for the component at Rs. 90 per unit to optimize the performance of his division.

Required:

- (i) Prepare a divisional profitability statement at each level of output, for divisions X and Y separately;
- (ii) Find out the profitability of the company as a whole at the output level where:
 - (a) Division X's net profit is maximum;
 - (b) Division Y's profit is maximum.
- (iii) Find out at what level of output, the company will earn maximum profit, if the company is not organized on profit centre basis.

Answer: (i) at 30,000 components profitability of X Rs. 4,50,000, loss of Y Rs. 9,90,000; (ii) Operating loss of the company X Rs. 5,40,000, profitability of company Y Rs. 3,97,500; (iii) maximum profit will be attained if 15,000 components are produced

Question : 19

CA Final Nov. 2003

Department X is a profit centre manufacturing products Vx, X1 and Xt. Each of the products can be sold in the outside market to the extent of the following:

Vx	900 units
X1	300 units
Xt	600 units

Market price per unit is Rs. 24, Rs. 23 and Rs. 20 for Vx, X1 and Xt respectively. Other details are given below:

Products	Vx	X1	Xt
	Rs.	Rs.	Rs.
Variable cost of production	17	12	14
Labour hours required	3	2	4

Product Vx can be transferred to department, but the maximum quantity that might be required for transfer is 400 units of Vx. The manager of department Y has power to buy the product Vx from the external market at a much cheaper price of Rs. 22.

What should be the transfer price for each unit for 400 units of Vx, if the total labour hours available in Department X is

- (a) 4,800 hours
- (b) 6,200 hours

Answer: (a) Rs. 21.50 (b) Rs. 19.625

Question : 20

Tycon Limited has two manufacturing department organized into separate profit centres known as Textile unit and Process House. The Textile unit has a production capacity of 5 lacs metres cloths per month, but at present its sales are limited to 50% to outside market and 30% to process house.

The transfer price for the year 2004 was agreed at Rs. 6 per metre. This price has been fixed in line with the external wholesale trade price on 1st January, 2004. However the price of yarn declined, which was the raw material of textile unit, effect that wholesale trade price reduced to Rs. 5.60 per metre with effect from 1st June, 2004. This price was however not made applicable to the sales made to the processing house of the company. The textile unit turned down the processing house request for revision of price.

The process house refines the cloth and packs the output known as brand Rayon in bundles of 100 metres each. The selling price of the Rayon is Rs. 825 per bundles. The process house has a potential of selling a further quantity of 1,000 bundles of Rayon provided the overall price is reduced to Rs. 725 per bundle. In that even it can buy the additional 1,00,000 metres of cloth from textile unit, whose capacity can be fully utilized. The outside market has not further scope.

The cost data relevant to the operation are:

	Textile unit	Process house
	Rs.	Rs.
Raw material (per metre) on 1 st June, 2004	3.00	Transfer price
Variable cost	1.20 (per metre)	80 (per bundle)
Fixed cost (per month)	4,12,000	1,00,000

You are required to:

- (i) Prepare statement showing the estimated profitability for June, 2004 for Textile unit and Process house and company as a whole on the following basis:
 - (a) At 80% and 100% capacity utilization of the Textile unit at the market price and the transfer price to the Processing house of Rs. 6 per metre.
 - (b) At 80% capacity utilization of the Textile unit at the market price of Rs. 5.60 per metre and the transfer price to the processing house of Rs. 6 per metre.
 - (c) At 100% capacity utilization of the Textile unit at the market price of Rs. 5.60 per metre and the transfer price to the Processing house of Rs. 5.60 per metre.
- (ii) Comment on the effect of the company's transfer pricing policy on the profitability of Processing house.

Answer: (i) (a) At 80% 3,08,000, 1,17,500, 4,25,000; at 100% 4,88,000, 12,500, 5,00,500; (b) 2,08,000, 1,17,500, 3,25,500 (c) 2,88,00, 1,12,500, 4,00,500 (ii) Processing house will not be interested in buying more than 1,50,000 metres from Textile unit.

Question : 21**CA Final May 2005**

AB Cycles Ltd. Has 2 division, A and B which manufacture bicycle. Division A produces bicycle frame and Division B assembles rest of the bicycle on the frame. There is a market for sub-

assembly and the final product. Each Division has been treated as profit centre. The transfer price has been set at the long-run average market price. The following data are available to each division:

Estimated selling price of final product	Rs. 3,000 p.u.
Long run average market price of sub-assembly	Rs. 2,000 p.u.
Incremental cost of completing sub-assembly in division B	Rs. 15,00 p.u.
Incremental cost in Division A	Rs. 1,200 p.u.

Required:

- (i) If division A's maximum capacity is 1,000 p.m. and sales to the intermediate are now 800 units, should 200 units be transferred to B on long term average price basis.
- (ii) What would the transfer price, if manager of Division B should be kept motivated.
- (iii) If outside market increases to 1,000 units, should Division A continue to transfer 200 units to Division B or sell entire production to outside market.

Answer: (i) 800 units should be sold as sale of intermediary and 200 units should be transferred to B (ii) Rs. 1,350 (iii) Full quantity should be sold outside as intermediary.

Question : 22

CA Final Nov. 2005

A company is organized into two division. Division X produces a component, which is used by division y in making of a final product. The final product is sold for Rs. 540 each. Division X has capacity to produce 2,500 units and division y can purchase the entire production. The variable cost of division X in manufacturing each component is Rs. 256.50.

Division X informed that due to installation of new machines, its depreciation cost had gone up and hence wanted to increase the price of component to be supplied to division y to Rs. 297, however division Y can buy the component from outside the market at Rs. 270 each. The variable cost of division y in manufacturing the final product by using the component is Rs. 202.50 (excluding component cost).

Present the statement indicating the position of each division and the company as whole taking each of the following situation separately:

- (i) If there is no alternative use for the production facility of X, will the company, if division y buys from out side suppliers at Rs. 270 per component?
- (ii) If internal facilities of X are not other wise idle and the alternative use of the facilities will annual cash saving of Rs. 50,625 to division X, should division Y purchase the component from outside suppliers?
- (iii) If there is no alternative use for the production facilities of division X and the selling price for the component in the outside market drops by Rs. 20.25, should division Y purchase from outside supplier?
- (iv) What transfer price would be fix for the component in each above circumstances?

Answer: (i) it will be beneficial for the company as whole to buy component from division X. (ii) & (iii) it is beneficial to buy component from outside. (iv) transfer price (a) Rs. 256.50 per component, (b) 276.75 per component, (c) Rs. 256.50 per component.

Question : 23

CA Final Nov. 2006

Division Z is a profit centre which produces four products A, B, C and D. Each product is sold in the external market also. Data for the period is:

	A	B	C	D
Market price per unit (Rs.)	150	146	140	130
Variable cost of pdn. Per unit (Rs.)	130	100	90	85
Labour hours required per unit.	3	4	2	3

Product D can be transferred to division y, but the maximum quantity that may be required for transfer is 2,500 units of D.

The maximum sales in the external market are:

A	2,800 units
B	2,500 units
C	2,300 units
D	1,600 units

Division Y can purchase the same product at a price of Rs. 125 per unit from outside instead of receiving transfer of product D from Division Z.

What should be the transfer price for each unit for 2,500 units of D, if the total labour hours available in division Z are 20,000 hours.?

Answer: Rs. 118.34

Question : 24

CA Final May 2008

X limited has two divisions, A and B, which manufacture products A and B respectively. A and B are profit centres with the respective Divisional Managers being given full responsibility and credit for their performance.

The following figures are presented:

	Division A	Division B
	Rs. Per unit	Rs. Per unit
Direct material cost	50	24* * other than A
Material A, if transferred from division A	-	144
Material A, if purchased from outside	-	160
Direct labour	24	14
Variable production overheads	20	2
Variable selling overhead	13	26
Selling price in outside market	160	300
Selling price to B	144	-
Selling price to S Ltd.	-	250

Other information to make one unit of B, one unit of component A is needed. If transferred from A, B presently take product A at Rs. 144 per unit. With A not incurring variable selling pverheads on units transferred to B.

Product A is available in the outside market at Rs. 160 per unit for competitors.

B can sell its product B in the external market at Rs. 300 per unit, whereas, if it supplied to X Ltd.'s subsidiary, S Ltd., it supplies at Rs. 250 per units, and need not incur variable selling overhead on units transferred to S Ltd. S Ltd. Requires 6,000 units and stipulates a condition that either all 6,000 units be taken from B or none at all.

	A	B
	Units	Units
Manufacturing capacity	20,000	28,000
Demand in external market	18,000	26,000
S Ltd.'s demand	-	6,000 or Zero

Assume that Division A and B will have to operate during the year. What is the best strategy for:

- (i) Department A?
- (ii) Department B, given that A will use its best strategy?
- (iii) For X Ltd. As a whole?

EDUCARE

CHAPTER – 14

PRICEING DECISION

Question: 1

An organization manufactures a product particulars of which are detailed below:

Annual production	20,000 units
Material cost	Rs. 60,000
Other variable costs	1,20,000
Fixed cost	40,000
Total cost	2,20,000
Apportioned investment	2,00,000

Determine the unit selling price under each of the following strategies. Assume that the organization's tax rate is 52%.

- (i) 20% return on investment;
- (ii) 30% mark-up based on total costs;
- (iii) 20% profit on net sales price;
- (iv) 15% profit on list sales when trade discount is 35%.
- (v) 50% mark-up based on value added by manufacturer.

Question: 2

Find out the selling price of an article whose costs for production and sale of 1,00,000 units are:

Material	Rs. 50,000
Labour	40,000
Overheads	1,60,000

The fixed portion of capital employed is Rs. 50,000 and the varying portion is 40% of sales turnover. A profit of 8% net on capital employed after payment of tax at 40% of the earnings is desired.

Question: 3

Engineers Ltd. Plans to introduce two products A and B in the market. These will be manufactured in Department X which will be treated as a profit center.

Production volumes and costs are estimated as follows:

Product	A	B
Annual production (units)	3,00,000	5,00,000

Direct material costs	Rs. 150 per unit	Rs. 180 per unit
Direct labour cost (Rs. 20 per hour)	300	420

The proportional of overheads other than interest, chargeable to two products A and B are as under:

Factory overheads (50% fixed) – 100% of direct wages.

Administration overheads (100% fixed) – 10% of factory cost

Selling and distribution overheads (50% variable) – Rs. 30 and Rs. 40 respectively per unit of product A and B.

The fixed capital investment in the department will be Rs. 2,500 lakhs. The working capital requirement is equivalent to six month's stock of cost of sales of the both the products. To finance this project a term loan of 50% of working capital requirement has been obtained from a financial institution at an interest rate of 18% per annum. Department X is expected to give a return of 20% on capital employed.

Required:

- Unit selling prices for products A & B such that the contribution per labour hour (rounded up to the next higher integer), is the same for both the products.
- Statement of overall profitability expected.

Question: 4

PH Ltd. Manufactures product S in departments A and B which also manufacture other products using the same machine. The particulars per unit of the product S are as under:

Direct material	M-8 kg. at Rs. 3 per kg. used in Dept. A
	P-4 kg. at Rs. 5 per kg. used in Dept. B
Direct labour	2 hours at Rs. 12 per hour in Dept A
	3 hours at Rs. 10 per hour in Dept. B

Overheads:	Dept. A	Dept. B
Method of recovery	Direct labour hours	Direct labour hours
Overheads rates		
Fixed	Rs. 6.00 per hour	Rs. 3.00 per hour
Variable	Rs. 5 per hour	Rs. 2.00 per hour
Value of plant & machinery	Rs. 16 lakhs	Rs. 8 lakhs

Variable selling and distribution overheads relating to product S amount to Rs. 20,000 per month. The product required a working capital of Rs. 3,00,000 at the target volume of 1000 units per month occupying 25% of the practical capacity.

Required:

- Using the return on investment pricing formula, find the price of Product S to yield a contribution to cover 24% rate of return on investment.
- If product S is a well established product in the market, what should be the basis for fixation of price. Set the minimum price on that basis.
- If product S is a new product about to be launched in the market, what should be the basis for fixation of price. Set the minimum price on that basis.

Question: 5

CA Final, Nov. 2002

A company has developed a new product. The sales volume of the new product was estimated to be between 15,000 and 20,000 units per month at a price of Rs. 20 per unit. Alternatively, if the selling price is reduced to Rs. 18 per unit, the sales volume will be between 24,000 and 36,000 units per month. If the production is maintained below 20,000 units per month, the variable manufacturing cost will be Rs. 16.50 per unit and the fixed costs Rs. 48,500 per month. If the production exceeds

20,000 units per month, the variable manufacturing cost will be reduced to Rs. 15.50 per unit, but the fixed costs will increase to Rs. 64,500 per month. The company paid Rs. 40,000 as fee for market survey and in addition incurred a cost of Rs. 60,000 in developing the new product.

In the event of taking up this new line of business, it will be necessary to use the building space, which has been let out for a rental of Rs. 5,600 per month.

You are required to analyse the potential profitability of the proposal of the company at different levels of output and make suitable recommendations relating to the price and volume of output to be set.

Answer: profit on sale of 20,000 units Rs. 15,900 and on 36,000 units is Rs. 19,900. Loss on sale of 15,000 units is Rs. 1,600 and on 24,000 units it is Rs. 10,100

Question: 6

CA Final, Nov. 1999

R Ltd. Will produce 3,00,000 kgs. of S and 6,00,000 kgs. of Y from an input of 9,00,000 kgs of raw material Z

The selling price of S is Rs. 8 per kg and that of Y is Rs. 6 per kg

Processing cost amount to Rs. 54 lacs per month as under:

Raw material Z 9,00,000 kgs. at Rs. 3 per kg	Rs. 27,00,000
Variable processing cost	Rs. 18,00,000
Fixed processing	Rs. 9,00,000
Total	54,00,000

There is an offer to purchase 60,000 kgs. of Y additionally at price of Rs. 4 per kg. The existing market for Y will not be affected by accepting the offer. But the price of S is likely to be decreased uniformly on all sales.

Find the minimum reduced average price for S to sustain the increased sales.

Answer: Rs. 7.91

Question: 7

CA Final, Nov. 2000

P.W. Perfume Company manufactures various qualities of perfumes and colognes. One popular line of colognes includes three products that result from a joint production process. Below are data from the most recent month of production:

Product	Sales price	Quantity	Joint cost	Cost after split off	Total cost
Evergreen	Rs. 40	10,000	Rs. 28	Rs. 20	Rs. 48
Morning flower	Rs. 100	6,000	Rs. 28	Rs. 40	Rs. 68
Evening flower	Rs. 150	4,000	Rs. 28	Rs. 50	Rs. 78

As the controller, you are called into the President's office with the Director of Marketing. The president says, "I don't understand your product cost report. Either, we are selling out largest volume product at a loss or the product cost data are all wrong. Now what is it?"

Required:

- (i) Respond to the president's question.

- (ii) Another company has just introduced a product that competes directly with morning flower. To compete successfully with the other company's product, the price of morning flower cologne must be reduced to Rs. 60. Should the company do so and sell below cost?
- (iii) If P.W. Perfume company has a policy of maintaining a gross margin of 20 per cent on sales, what would your answer be in response to the price reduction in part (ii)?
- (iv) What is the minimum price for which Morning Flower can sell and still meet the 20 per cent product gross margin for the group of products?

Answer: (i) profit earned from Evergreen Rs. 83,333, Morning flower Rs. 1,50,000 & Evening Flower Rs. 1,66,667; (ii) the company should sell morning flower below cost (iii) A reduction in sale price would result in a loss of revenue of Rs. 1,40,000; (iv) minimum price per unit is Rs. 83.33.

Question: 8

CA Final, Nov. 2001

C Ltd. An Indian Company has entered into an agreement of strategic alliance with Z Inc. of United States of America for the manufacture of personal computer in India. Broadly, the terms of agreement are:

- (i) Z will provide C with Kits in a dismantled condition. These will be used in the manufacture of the personal computer in India. On a value basis, the supply, in terms of the FOB price will be 50% thereof.
- (ii) C will procure the balance of materials in India.
- (iii) Z will provide to C with designs and drawings in regard to the materials and supplies to be procured in India. For this, C will pay Z a technology fee of Rs. 3 crores.
- (iv) Z will also be entitled to a royalty at 10% of the selling price of the computers fixed for sales in India as reduced by the cost of standard items procured in India and also the cost of imported kits from Z.
- (v) C will furnish to Z detailed quarterly returns.

Other information available:

- (i) FOB Price agreed \$ 510, Exchange rate to be adopted \$ 1 = Rs. 47.059 [note: in making calculations, the final sum may be rounded to the next rupee.]
- (ii) Customs duty leviable is 150% of the CIF prices; but as a concession, the actual rate leviable has been fixed at 30% of CIF.
- (iii) The technology agreement expires with the production of 2,00,000 computers.
- (iv) The quoted price on kits includes a 20% margin of profits on cost to Z.
- (v) The estimated cost of materials and supplies to be obtained in India will be 140% of the cost of supplies made by Z.
- (vi) 48% of the value in rupees of the locally procured goods represent cost of the standard items.
- (vii) Cost of assembly and other overheads in India will be Rs. 2,000 per personal computer.

Required:

Calculate the selling price of a personal computer in India bearing in mind that C has targeted a profit of 20% to itself on the selling price.

Answer: selling price per computer Rs. 43,000.

Question: 9

CA Final, Nov. 2003

A manufacturing company has an installed capacity of 1,50,000 units per annum. Its cost structure is given below:

	(per unit) Rs.
Variable costs	10
Labour (Minimum Rs. 1,00,000 per month)	10
Overheads	4
Fixed overheads	Rs. 1,92,300 per annum

Semi-variable overheads Rs. 60,000 per annum at 75% capacity, which increase by Rs. 4,000 per annum for every 5% increase in capacity utilization for the year as a whole.

The capacity utilization for the next year is estimated at 75% for three months, 80% for six months and 90% for the remaining part of the year. If the company is planning to have a profit of 20% on the selling price, calculate the selling price per unit.

Answer: selling price per unit Rs. 32.90

Question: 10

CA Final, Nov. 2007

S limited is engaged in manufacturing activities. It has received a request from one of its important customers to supply a product which will require conversion of material 'M', which is a non-moving item.

The following details are available:

Book value of material M	Rs. 60
Realizable value of material M	Rs. 80
Replacement cost of material M	Rs. 100

It is estimated that conversion of one unit of 'M' into one unit of the finished product will require one labour hour. At present, labour is paid at the rate of Rs. 20 per hour. Other costs are as follows:

Out of pocket expenses	Rs. 30 per unit
Allocated overheads	Rs. 10 per unit.

The labour will be re-deployed from other activities. It is estimated that the temporary redeployment will not result in loss of contribution. The employees to be re-deployed are permanent employees of the company.

Required:

Estimate the minimum price to be charged from the customer so that the company is not worse off by executing the order.

Answer: Rs. 110 per unit

Question: 11

CA Final, May 2005

Determine the selling price per unit to earn a return of 12% net on capital employed (Net of Tax @ 40%)

The cost of production and sales of 80,000 units per annum are:

Material	Rs. 4,80,000	Labour	Rs. 1,90,000
Variable overhead	Rs. 3,20,000	Fixed overhead	Rs. 5,00,000

The fixed portion of capital employed is Rs. 12 lacs and the varying portion is 50% of sales turnover.

Answer: selling price per unit will be Rs. 23.61

Question: 12

CA Final, May 2006

An organization manufactures a product, particulars of which are detailed below:

Annual production (units)	20,000
Cost per annum (Rs.)	
Material	50,000
Other variable cost	60,000
Fixed cost	40,000
Apportioned Investment (Rs.)	15,00,000

Determine the unit selling price under two strategies mentioned below.

Assume that the organization's Tax rate is 40%

- 20% return on investment.
- 6% profit on list sales, when trade discount is 40%

Answer: (a) Rs. 10 (b) Rs. 9

Question: 13

CA Final, May 1995

ABC Ltd. Has developed a new product which is about to be launched into the market. The variable cost of selling the product is Rs. 17 per unit. The marketing department has estimated that at a sale price of Rs. 25, annual demand would be 10,000 units. However, if the sale price is set above Rs. 25, sales demand would fall by 500 units for each Rs. 0.50 increase above Rs. 25. Similarly, if the price is below Rs. 25, demand would increase by 500 units for each Rs. 0.50 stepped reductions in price below Rs. 25.

Determine the price which would maximize ABC Ltd's profit in the next year.

Question: 14

CA Final, May 1988

A Small scale manufacturer produces an article at the operated capacity of 10,000 units while the normal capacity of his plant is 14,000 units. Working at a profit margin of 20% on sales realization, he has formulated his Budget as under:-

	10,000	14,000
	Rs.	Rs.
Sales realization	2,00,000	2,80,000
Variable overheads	50,000	70,000
Semi variable overheads	20,000	22,000
Fixed overheads	40,000	40,000

He gets an order for a quantity equivalent to 20% of the operated capacity and even on this additional production profit margin is desired at the same percentage on Sales Realization as for production to operated capacity.

Assuming prime cost is constant per units of production, what should be the minimum price to realize this objective?

Answer: 13.125

Question: 15

CA Final, May 1990

Electromatic Excellers Ltd. Specialize in the manufacture of novel transistors. They have recently developed technology to design a new radio transistor capable of being used as an emergency lamp also. They are quite confident of selling all the 8,000 units that they would be making in a year. The capital equipment that would be required will cost Rs. 25 lakhs. It will have an economic life of 4 years and no significant terminal salvage value.

During each of the first four years promotional expenses are planned as under:-

Advertisement	1,00,000	75,000	60,000	30,000
Other Expenses	50,000	75,000	90,000	1,20,000

Variable fixed operating costs incurred because of this new product are budgeted at Rs. 75,000 per year.

The company's profit goals call for a discounted rate of return of 15% after taxed on investments on new products. The income tax rate on an average works out to 40%. You can assume that the straight line method of depreciation will be used for tax and reporting.

Work out an initial selling price per unit of the product that may be fixed for obtaining the desired rate of return on investment.

Present value of annuity of Rs. 1 received or paid in a steady stream through 4 years in the future at 15% is 3.0079.

Answer: selling price Rs. 399.20 per unit.

Question: 16

CA Final, May 1999

The financial controller of ACE Ltd. Has prepared the following estimates of working results for the year ending 31st march, 1999:

		Year ending	
		31-3-1999	
Direct material	Rs./unit	16.00	
Direct labour	Rs./unit	40.00	
Variable overheads	Rs/unit	12.00	
Selling price	Rs./unit	125.00	
Fixed Expenses	Rs.	6,75,000	Per annum
Sales	Rs.	25,00,000	Per annum.

During the year 1999-2000, it is expected that the material prices and variable overheads will go up by 10% and 5% respectively. As a result of re-engineering of business processes, the overall direct labour efficiency will increase by 12%, but the wage rate will go up by 5%. The fixed overheads are also expected to increase by Rs. 1,25,000.

The vice president- manufacturing states that the same level of output as obtained in 1998-1999 should be maintained in 1999-2000 also and efforts should be made to maintain the same level of profit by suitably increasing the selling price.

The Vice-President Marketing states that the market will not absorb any increase in the selling price. On the other hand, he proposes that publicity involving advertisement expenses as given below will increase the quantity of sales as under:

Advertisement exp.	80,000	1,94,000	3,20,000	4,60,000
Additional units of sales	2,000	4,000	6,000	8,000

Required:

- Present an Income Statement for 1999-2000.
- Find the revised price and the percentage of increase in the price for 1999-2000, if the views of the Vice-President Manufacturing are accepted.
- Evaluate the four alternative proposals put forth by the Vice-President Marketing. Determine the best output level to be budgeted and prepare an over all Income Statement for 1999-2000 at that level of output.

Answer: (a) profit Rs. 3,46,000 (b) percentage increase in selling price 4.76% (c) additional units of sales :

2,000	4,000	6,000	8,000
Rs.	Rs.	Rs.	Rs.
34,600	35,200	23,800	(1,600)

Question: 17

CA Final, Nov. 1999

Chum Chum Ltd. Is about to introduce a new product with the following estimates :

Price per Unit in Rupees	Demand (in thousand units)
30-00	400
31-50	380
33-00	360
34-50	340
36-00	315
37-50	280
39-00	240

Cost:

Direct material	Rs. 12 per unit
Direct labour	Rs. 3 per unit
Variable overheads	Rs. 3 per unit.
Selling expenses	10% on sales
Fixed production overheads	Rs. 14,40,000
Administration expenses	Rs. 10,80,000

Judging from the estimates determine the tentative price of the new product to earn maximum profit.

Answer: the price should be Rs. 36.00 per unit to earn maximum profit.

CHAPTER - 15

SERVICE COSTING

Question: 1

CA Final, Nov. 1997

You are required to calculate a suggested fare per passenger/km from the following information for a Mini Bus:

- (a) Length of route : 30 km
- (b) Purchase price Rs. 4,00,000
- (c) Part of above cost met by loan, annual interest of which is Rs. 10,000/p.a.
- (d) Other annual chares: Insurance Rs. 15,000, Garage rent Rs. 9,000, Road tax Rs. 3,000, repairs & maintenance Rs. 15,000, Administrative charges RS. 5,000.
- (e) Running expenses: Driver & conductor Rs. 5,000 p.m. Repair/Replacement of tyre tube Rs. 3,600 p.a., Diesel and oil cost per km Rs. 5
- (f) Effective life of vehicle is estimated at 5 years at the end of which it will have a scrap value of Rs. 10,000
- (g) Mini bus has 20 seats and is planned to make six no. two-way trips for 25 days/p.m.
- (h) Provide profit @ 20% of total revenue.

Question: 2

CA Final, May 1998

Modern airways owns a single jet aircraft and operates between EXETOWN and WYETOWN. Flights leave EXETOWN on Mondays and Thursdays and depart from WYETOWN on Wednesdays and Saturdays. Modern Airways cannot afford any more flights between EXETOWN and WYETOWN. Only tourist class seats are available on its flights. An analyst has collected the following information:

Seating capacity per plane	360
Average passengers per flight	200
Flights per week	4
Flights per year	208
Average one way fare	Rs. 5,000
Variable fuel costs	Rs. 1,40,000 per flight
Food service to passengers (not charged to passengers)	Rs. 200 per passenger
Commission paid to travel agents paid by	
Modern airways on each ticket booked on	
Modern airways. (Assume that all modern airways tickets are booked by	
Travel agents)	8% of fare
Fixed annual lease costs allocated to each flight	Rs. 5,30,000 per flight
Fixed ground services (maintenance, check-in, baggage handling) cost allocated to each flight	Rs. 70,000 per flight
Fixed salaries of flight crew allocated to each flight	Rs. 40,000 per flight

For the sake of simplicity, assume that fuel costs are unaffected by the actual number of passengers on a flight.

Required:

- (a) What is the operating income that modern airways makes on each one-way flight between EXETOWN and WYETOWN?
- (b) The market research department of modern airways indicated that lowering the average one-way fare to Rs. 4,800 will increase the average number of passengers per flight to 212. Should modern airways lower its fare?
- (c) ZED tours and Travels, a tour operator, approaches Modern Airways to charter its jet aircraft twice each month, first to take Zed's international tourists from EXETOWN to WYETOWN and then bring the tourists back from WYETOWN to EXETOWN. If modern airways accepts the offer, it will be able to offer only 184 (208 minus 24) of its own flights each year. The terms of the charter are:
 - For each one-way flight Zed will pay modern Rs. 7,50,000 to charter the plane and to use its flight crew and ground service staff.
 - Zed will pay for fuel costs.
 - Zed will pay for all food costs.

On purely financial consideration, should Modern Airways accept the offer from Zed Tours and Travels? What other considerations should Modern Airways consider in deciding whether or not to charter its plane to Zed Tours and Travels?

Question: 3

CA FIANL Nov. 1998

A company presently brings coal to its factory from a nearby yard and the rate paid for transportation of coal from the yard located 5 km. away to factory is Rs. 50 per ton. The total coal to be handled in a month is 24,000 tonne. The company is considering proposal to buy its own truck and has the option of buying either a 10 tonne capacity or a 8 tonne capacity truck.

The following information's are available:

	10 tonne truck	8 tonne truck
Purchase price	Rs. 10,00,000	8,50,000
Life (year)	5	5
Scrap value at the end of 5th year	Nil	Nil
Km. per litre of diesel	3	4
Repair/Maint. P.a. per truck	60,000	48,000
Other fixed expenses p.a.	60,000	36,000
Lubricants & Sundries per 100 km.	Rs. 20	Rs. 20

Each truck will daily make 5 trips (to and fro) on an average for 24 days in a month

Cost of Diesel Rs. 15 per liter

Salary of Drivers Rs. 3,000 per month- Two Drivers will be required for a truck.

Other staff expenses Rs. 1,08,000 p.a.

Present a comparative cost sheet on the basis of above data showing transport cost per tone of operating 10 and 8 truck at full capacity utilization.

Question: 4**CA Final Nov. 1998**

A company can produce and sell at its maximum capacity 20,000 units of a product. The sale price is Rs. 100. The present sales is 15,000 units. To produce over 20,000 units and upto another 10,000 units some balancing equipments are to be installed at a cost of Rs. 10 lakhs and the same will have a life span of 10 years.

The current cost structure is as under:

Direct material	30% of sale value
Direct labour	20% of sale value
Variable overheads	Rs. 20 per unit
Profit	Rs. 15 per unit.

The present cost is estimated to go up due to price escalation as under:

10% in direct material from present level of 30%
25% in direct labour from present level of 20%
Rs. 50,000 in fixed overheads per year.

There is a concrete proposal from a party to take 10,000 units additionally over the present level of output on a long-term basis at a unit price of Rs. 90. Apart from the investment of Rs. 10 lakhs, as shown above, the fixed overheads will increase by Rs. 30,000 due to additional administrative expenses.

The company is in a dilemma as to whether to accept the order for 10,000 units or to use the present unused capacity of 5,000 units for which there will be additional selling expenditure of Rs. 50,000.

Ignore financing charges and give your recommendation.

Question: 5**CA Final Nov. 2004**

A manufacturing company runs its boiler on furnace oil obtained from X oil company and Y oil company whose depots are situated at a distance of 24 kms and 16 kms from the factory site.

Transportation of furnace oil is made by company's own tank Lorries (two) of 8 ton capacity each. Onward trips are made only with full load and the Lorries return empty. The filling time takes an average of 40 minutes for X Oil Company and 30 minutes for Y Oil Company. The empty time in the factory is only 40 minutes for each. The average speed of Lorries works out to be 24 km. per hour.

The varying operating charges average 80 paise per km covered and fixed charges give an incidence of Rs. 7.50 per hour of operation.

Calculate the transportation cost per ton-km for each source of furnace oil.

Question: 6**CA Final Nov. 2003**

Asha Road Carriers is a transporting company that transports goods from one place to another. It measures quality of service in terms of:

1. Time required to transport goods
2. On-time delivery
3. Number of lots or damaged cartons.

To improve its business prospects and performance the company is seriously considering to install a scheduling and tracking system which involves an annual outlay of Rs. 1,50,000, beside equipments costing Rs. 2,00,000 needed for installation of the system. The company proposes to utilize the proceeds of the fixed deposit maturing next month to purchase the equipment. The rate of interest at present on deposit is 10%. The company furnishes the following information about its present and anticipated future performance:

	Current	Expected
On-time delivery	85%	95%
Variable costs per carton lost or damaged	Rs. 50	Rs. 50
Fixed costs per carton lost	Rs. 30	Rs. 30
Number of cartons lost or damaged	3,000	1,000

The company expects that each per cent point increase in on-time performance will result in revenue increase of Rs. 18,000 per annum. Contribution margin of 45% is required. Should Asha Road carriers acquire and install the new system?

Question : 7

A multinational company runs Public Medical Health Centre. For this purpose, it has hired a building at a rent of Rs. 10,000 per month with 5% of total taking. Health centre has three types of wards for its patients namely. General ward, Cottage ward and Deluxe ward. State the rent to be charged to each bed-day for different type of ward on the basis of the following information's:

- (i) The number of beds of each type are General ward 100, Cottage ward 50, Deluxe ward 30.
- (ii) The rent of Cottage ward bed is to be fixed at 2.5 times of the General ward bed and that of Deluxe ward bed as twice of the Cottage ward bed.
- (iii) The occupancy of each type of ward is as follow:
General ward 100%, Cottage ward 80% and Deluxe ward 60%. But, in general ward there were occasions when beds are full, extra beds were hired at a charges of Rs. 20 per bed. The total hire charges for the extra beds incurred for the whole year amount to Rs. 12,000.
- (iv) The Health centre engaged a heart specialist from outside and on an in the whole year.
- (v) The other expenses for the year were as under:

Salary of Supervisors, Nurses, Ward boys	4,25,000
Repairs and maintenance	90,000
Salary of doctors	13,50,000
Food supplied to patients	40,000
Laundry charges for their bed linens	80,500
Medicines supplied	74,000
Cost of oxygen, X-ray etc. other than directly borne for	49,500

treatment of patients	
General administration charges	63,000

- (vi) Provide profit @ 20% on total taking.
- (vii) The Health centre imposes 8% service tax on rent received.
- (viii) 360 days may be taken in a year.

Answer:

General ward	Rs. 32.22	Rs. 33.10*
Cottage ward	Rs. 80.55	Rs. 82.76*
Deluxe ward	Rs. 161.08	Rs. 165.51*

*** if total taking includes service Tax.**

Question : 8

Kangan Resorts operates a lodging house with attached facilities of a shopping arcade and restaurant on a National highway. The following details are available.

- (i) The lodging house has 40 twin-bedded rooms, which are to be rented for Rs. 200 per night on double occupancy basis. The occupancy ratio is expected at 85% and always both the beds in the room will be occupied. The lodging facilities are operated, for 200 days in the year during foreign tourists season time only.
- (ii) As per past record the spending pattern of each tourist staying in the lodge will be as under:
- (iii) Ratios of variable costs to respective sales volume are:

Shops	Restaurant
50%	60%
- (iv) For the lodging house the variable cost on house keeping and electricity will amount Rs. 30 per day per occupied room.
- (v) Annual fixed overhead for the entire complex is estimated at Rs. 10,00,000

Required:

- (i) Prepare an income statement for the next year:
The lodging House Manager suggests a proposal of reducing room rent to Rs. 150 per day on double occupancy basis, which will increase occupancy level to 95%. Should the proposal be

CHAPTER-16

SPECIAL TECHNIQUES OF COSTING

Total Quality Management

Question: 1

A company using a continuous manufacturing operation achieves an output of 3 kg per hour. The selling price is Rs. 450 per kg. the raw material cost is Rs. 125 per kg of output and the direct labour and variable overheads amount Rs. 316 per kg of output. The company has provided an expenditure of Rs. 640 on maintenance and Rs. 6,400 on breakdown repairs per month in its budget. Breakdowns averaging 300 hours per month occur to mechanical faults. These could be reduce or eliminated, if additional maintenance on the following scale were under taken:

Breakdown hours	0	60	120	180	240	300
Maintenance costs(Rs.)	20,480	10,240	5,120	2,560	1,280	640
Repair costs (Rs.)	0	1920	2,560	3,840	5,120	6,400

Using the incremental cost and incremental revenue concept you are required to :

- (i) Determine the optimum level upto which breakdown can be reduce to increase production.
- (ii) Calculate the additional profits obtainable at that level as compared to the present situation.

Answer: (i) contribution per hour = 27 (ii) additional profit at optimum level compared to present position.

Question: 2

Hulk Road Carriers is a transporting company that transports goods from one place to another. It measures quality of service in terms of : (i) time required to transport goods; (ii) on-time delivery; (iii) Number of lost or damaged cartons.

To improve its business prospects and performance, the company is seriously considering to install a scheduling and tracking system, which involves an annual outlay of Rs. 1,50,000, besides equipments costing Rs. 2,00,000 needed for installation of the system. The company proposes to utilise the proceeds of the fixed deposit maturing next month to purchase the equipment. The rate of interest at present on deposit is 10%. The company furnishes the following about its present and anticipated future performance:

Particulars and On-time deliver %	Current at 85%	Expected at 95%
Variable costs per carton lost or damaged	Rs. 50	Rs. 50
Fixed costs per carton lost	Rs. 30	Rs 30
Number of cartons lost or damaged	3,000	1,000

The company expects that each percent point increase in on-time performance will result in revenue increase of Rs. 18,000 per annum. Contribution margin of 45% is required. Should Hulk Road carriers acquire and install the new system?

Answer: the new system may be implemented.

Question: 3

Sent Ltd. manufactures and sells 20,000 copiers each year. The variable and fixed costs of reworking and repairing copiers are as follows (in Rs.) :

Particulars	Variable costs	Fixed costs	Total costs
Rework costs per copier	1,600	2,400	4,000
Repair costs per copier:			
Customer-support cost	80	120	200
Transportation cost for repair parts	180	60	240
Warranty repair costs	1,800	2,600	4,400

Sent's engineers are currently working to solve the problem of copiers being too light or too dark. They propose changing the lens of the copier. The new lens will cost Rs. 50 more than the old lens. Each copier uses one lens. Sent Uses 1- year time horizon for this decision, since it plans to introduce a new copier at the end of the year.

Sent believes that even if it improves quality, it will not be able to save any of the fixed costs or rework or repair.

However, by changing the lens, SENT expects that it will (1) rework 300 fewer copiers, (2) repair 200 fewer copiers, and (3) sell 100 additional copiers. SENT's unit contribution margin on its existing copier is Rs. 6000.

Required

- (i) What are the additional costs of choosing the new lens?
- (ii) What are the additional benefits of choosing the new lens?
- (iii) Should SENT use the new lens?

Answer : (i) Additional costs of choosing the new lens = 10,00,000 (ii) additional benefits of choosing the new lens = 14,87,000 (iii) SENT may use the new lens.

Question: 4

Molar Ltd. makes and sells a single product, the unit specifications are as follows –

Direct Materials X	8 sq. metre at Rs 40 per square metre
Machine time	0.6 Running hours
Machine costs per gross hour	Rs. 400
Selling price	Rs. 1,000

Molar Ltd required to fulfil orders for 5,000 product unit per period. There are no stocks of product unit at the beginning or end of the period under review. The stock level of Material X remains unchanged throughout the period.

Molar Ltd. is planning to implement a Quality Management Programme (QMP). The following additional information regarding costs are revenues are given as of now and after implementation of Quality Management Programme.

Before the implementation of QMP	After the implementation.
1. 5% of incoming material from suppliers scrapped due to poor receipt and storage organization.	1. Reduced to 3%
2. 4% of material X input to the machine process is wasted due to processing problems.	2. Reduced to 2.5%
3. Inspection and storage of Material X costs Rs. 1 per square metre purchased.	3. No change in the unit rate
4. Inspection during the production cycle, calibration checks on inspection equipment, vendor rating and other check cost Rs. 2,50,000 per period.	4. Reduction of 40% of the existing cost.
5. Production Quantity is increased to allow for the downgrading of 12.5% of the production units at the final inspection stage. Downgraded unit are sold as "seconds" at a discount of 30% of the standard selling price.	5. Reduction to 7.5%
6. Production Quantity is increased to allow for return from customers (these are replaced free of charge) due to specification failure and account for 5% of units actually delivered to customers.	6. Reduction 2.5%
7. Product liability and other claims by customers is estimated at 3% of sales revenue from standard product sales.	7. Reduction 1%
8. Machine idle time is 20% of gross machine hours used (i.e. Running hour = 80% of gross hours)	8. Reduction 12.5%
9. Sundry costs of Administration, Selling and Distribution total – Rs. 6,00,000 per period.	9. Reduction by 10% of the existing.
10. Prevention Programme costs Rs. 2,00,000.	10. Increase to Rs. 6,00,000

The WMP will have a reduction in Machine Run Time required per product unit to 0.5 hour. Required:

- (i) Prepare summarise showing the calculation of (i) Total production units (pre-inspection), (ii) purchase of Materials X (square metres), (iii) Gross Machine Hours. In each case, the figures are required for the situation both before and after the implementation of the QMP so that orders for 5,000 product unit can be fulfilled.
- (ii) Prepare profit and loss account for molar Ltd. for the period showing the profit earned both before and after the implementation of the Total Quality Programme.

Question: 5

Keep Raining Industries manufactures 2 types of refrigerator, Deep Cool & Ice Cool. The following information is available on each refrigerator-

Particular	Deep Cool	Ice Cool
Units manufactured and sold	10,000 units	5,000 units
Selling Price	Rs. 20,000	Rs. 15,000
Variable costs per unit	Rs. 12,000	Rs. 8,000
Hours spent on design	6,000 hours	1,000 hours
Testing and inspection hours per unit	1	0.5
Percentage of units reworked in plant	5%	10%
Rework costs per refrigerator	Rs. 5,000	Rs. 4,000
Percentage of units repaired at customer site	4%	8%
Repair cost per refrigerator	Rs. 6,000	Rs. 4,500
Estimated lost sales from poor quality	-	300 units

The labour rates per hour for various activities are as follows:

Design Rs. 750 per hour Testing and inspection Rs. 400 per hour

Required:

- Calculate the costs of quality for the two models, classified into prevention, appraisal, internal failure, and external failure categories.
- For each type of refrigerator, calculate the ratio of each COQ category as a percentage of revenues.

Compare and comment on the costs of quality for the two models.

Answer: Costs in Rs. Lakhs for Deep Cool : Prevention = 45; Appraisal = 40; Internal Failure = 25; External Failure = 24; For Ice Cool: Prevention = (7.5) ; Appraisal = (10); Internal failure = 20; External Failure = 39.

Question: 6

Truth Hopper Ltd. (THL) uses multicolor moulding to make plastic lamps. The moulding operation has a capacity of 200000 units per year. The demand for lamps is very strong. THL will be able to sale whatever output quantities it can produce at Rs. 40 per lamp.

THL can start only 2,00,000 units into production in the moulding department because of capacity constraints on the molding machines. If a defective unit is produced at the moulding operation, it must be scrapped, and the scrap yields no revenue. Of the 2,00,000 units started at the moulding operation, 30,000 units (15%) are scrapped. Scrap costs, based on total (fixed and variable) manufacturing costs incurred up to the molding operation equal Rs. 25 per unit as follows:

Direct Materials (variable)	Rs. 16 per unit
Direct Manufacturing Labour, Setup Labour and Materials-Handling Labour (variable)	Rs. 3 per unit
Equipment Rent, and other allocated overhead including inspection and testing costs on scrapped parts (fixed)	Rs. 6 per unit

Total	Rs. 25 per unit.
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THL's designers have determined that adding a different type of material to the existing direct materials would reduce scrap to zero, but it would increase the variable costs by Rs. 4 per lamp in the Moulding department.

Should the Company use the new material? Show your calculations.

Answer: Additional Benefit = Rs. 4,00,000. Hence, the new material may be purchased.

Question :7

A Company has a continuous manufacturing process involving an output of 6 tonnes per hour valued at Rs. 70 per tone. Process wages cost Rs. 60 per hour and raw material is Rs. 35 per tone of the product. Regular maintenance cost is Rs. 750 per week.

The company is experiencing breakdowns due to mechanical faults averaging 25 hours a week, costing Rs. 7,500 to repair. It is estimated that these breakdown can be reduced or eliminated if additional maintenance on the following scale were undertaken.

Breakdown hours per week	0	5	10	15	20
Maintenance Costs (Rs.)	23,000	13,000	6,500	3,000	1,500
Repair costs (Rs.)	0	2,500	3,000	5,000	6,500

Process Labour during stoppages can be used elsewhere upto 10 hours per week. You are required to:

- Present in a tabular form, the optimum amount of maintenance to be undertaken each week.
- Compute the additional revenue that will be resulting from the optimal level, compared with the present level.

Answer: Optimum amount of maintenance is 15 hours a week, involving a total costs of Rs. 8,300. Additional revenue from this optimum level, when compared to the present position = Rs. 2,350

Question: 8

Mobil Inc. sells 3,00,000 V262 valves to the automobile and trade industry. It has a capacity of 1,10,000 machine-hours and can produce three valves per machine-hour. V262's contribution margin per unit is Rs. 8. Mobil sells only 3,00,000 valves because 30,000 valves (10% of the goods valves) need to be reworked. It takes 1 machine hour to rework 3 valves so that 10,000 hours of capacity are lost in the rework process. Mobil's rework costs are Rs. 2,10,000, consisting of :

Direct Materials and Direct Rework Labour (variable costs) Rs. 3 per unit.
Fixed costs of equipment, rent, and overhead allocation. Rs. 4 per unit.

Mobil's process designers have come up with a modification that would maintain the speed of the process and would ensure 100% quality and no rework. The new process would cost Rs. 3,15,000 per year. The following additional information is available.

- (i) The demand for Mobil's V262 valves is 370,000 per year.
- (ii) Jackson has asked Mobil to supply 22,000 T971 valves if Mobil implements the new design. The contribution margin per T971 valves is Rs. 10. Mobil can make two T971 valves per machine-hour on the existing machine with 100% quality and no rework.

Required:

- (i) Should Mobil implement the new design?
- (ii) If Mobil's designers implemented the new design, should Mobil accept Jackson's order of 22,000 T971 valves?

Answer: (a) Benefits = Rs. 2,40,000 + Rs. 90,000 = Rs. 3,30,000; Hence new design can be implemented. (b) contribution per machine hour for existing valve is Rs. 24 but for Jackson only Rs. 20. Hence reject offer.

Activity Based Costing

Question: 1

AERODEC INC., manufactures and sells two types of wooden deck chairs, Deluxe and Tourist. Annual sales in units, Direct labour-hours (DLHs) per unit and Total labour-hours per year are provided below:

Deluxe deck chair (2,000 units * 5 direct labour hours per unit)	10,000 hours
Tourist deck chair (10,000 units * 4 direct labour hours per unit)	40,000 hours
Total direct labour hours	50,000 hours

Costs for materials and labour of one unit of each product are

	Deluxe (Rs)	Tourist (Rs.)
Direct materials	25	17
Direct labour (at Rs. 12 per DLH)	60	48

Manufacturing overhead costs total Rs. 8,00,000 each year. The breakdown of these costs among the company's six activity cost pools is given below. The activity measures are shown in brackets.

Activity and activity measures	Estimated OH	Expected Activity levels		
	In Rs.	Total	Deluxe	Tourist
Labour related (direct labour-hours)	80,000	50,000	10,000	40,000
Machine setup (number of setups)	1,50,000	5,000	3,000	2,000
Parts administration (Number of parts)	1,60,000	80	50	30
Production orders (number of orders)	70,000	400	100	300
Material receipts (Number of receipts)	90,000	750	150	600
General factory (Machine hours)	2,50,000	40,000	12,000	28,000
	8,00,000			

Required:

- Classify each of Aerodec's activities as either a Unit level, Batch level, product level, or Facility level activity.
- Assume that the company applies overhead cost to products on the basis of direct labour hours.
 - Compute the predetermined overhead rate that would be used.
 - Determine the unit product cost of each product, using the predetermined overhead rate computed above
- Assume that the company used Activity Based Costing to compute overheads rates.
 - Compute the activity rate (i.e. predetermined overhead rate) for each of the six centers listed above.
 - Using the above ABC rates, find the amount of OH cost that would be assigned to a unit of each product.

- Determine the unit product cost of each product and compare this cost to the cost computed using the rate based on direct labour hours.

Question: 2

HOWZAT co manufactures several products of varying levels of desing and models. It uses a single overhead recovery rate based on direct labour hours. The company's overheads in the first half of the year are as under:

Particulars	Rs.
Machine operation expenses	10,12,500
Machine maintenance expenses	1,87,500
Salaries of technical staff	6,37,500
Wages and salaries of stores staff	2,62,500

During this period, the company introduced Activity Based costing system and the following significant activities were identified – (a) Receiving materials and components; (b) set up of machines for production runs and (c) Quality inspection. It is also determined that:

- The machine operation and machine maintenance expenses should be apportioned between stores and production activity in 20:80 ratio.
- The technical staff salaries should be apportioned between machine maintenance, set up and quality inspection in 30:40:30 ratio.

Particulars	Rs.
Direct Labour hours worked	40,000
Direct wage rate	Rs. 6 per hour
Production set ups	2,040
Material and component consignment received for suppliers	1,960
Number of quality inspections carried out	1,280

The data relating to two products manufactured by the company during the period are as under

Particular	Product P	Product C
Direct material costs	SRs. 6,000	Rs. 4,000
Direct labour hours	960	100
Direct material consignments received	48	52
Production runs	36	24
Number of quality inspection done	30	10
Quantity produced (units)	15,000	5,000

A potential customer has approached the company for the supply of 24,000 units of a component K to be delivered in lots of 3,000 units per quarter. The job will involve an initial design cost of Rs. 60,000 and the manufacture will involve the following per quarter:

Direct material cost	Rs. 12,000
Direct labour hours	300
Production runs	6
Inspections	24
Number of consignments of direct material to be received	20

The company desires a mark up of 25% on cost.

Required :-

- (i) Calculate the cost of Products P and Q based on the existing system of single overhead recovery rate.
- (ii) Determine the cost of Products P and Q using Activity Based Costing system
- (iii) Compute the sales value per quarter of component K using Activity Based costing system.

Answer:

Question: 3

XYZ Ltd. manufactures four products namely A, B, C and D using the same plant and process. The following information relates to a production period –

Product	A	B	C	D
Output in units	720	600	480	504
Costs per unit:				
Materials	Rs. 42	Rs. 45	Rs. 40	Rs. 48
Labour	Rs. 10	Rs. 9	Rs. 7	Rs. 8
Machine hours per unit	4 hours	3 hours	2 hours	1 hour

The four products are similar and are usually produced in production runs of 24 units and sold in batches of 12 units. The company presently uses machine hour rate for absorbing production overhead. The total overheads incurred by the company for the period is – (a) machine operation and Maintenance costs = Rs. 63,000; (b) Set up costs = Rs. 20,000; (c) stores receiving = Rs. 15,000; (d) Inspection = Rs. 10,000 and (e) Material Handling and dispatch = Rs. 2,592. During the period, the following cost drivers are to be used for the overhead cost.

Cost	Set up	Stores receiving	Inspection	Materials Handling
Cost driver	No. of production runs	Requisitions raised	No. of production runs	Orders executed.

It is also determined that-

- Machine operation and maintenance cost should be apportioned between set up cost, stores receiving and inspection activity in the ratio of 4:3:2.
- Number of requisitions raised on stores is 50 for each product and the number of order executed is 192, each order being for a batch of 12 of a product.

Required:

- (i) Calculate the total costs for each product if all overhead costs are absorbed on a machine hour basis.
- (ii) Calculate the total costs for each product, using Activity-Based Costing system.
- (iii) Comment briefly on difference disclosed between OH traced by present system and those traced by ABC.

Question: 4

During the last 20 years, KL Ltd's manufacturing operation has become increasingly automated with computer controlled robots replacing operators. KL currently manufactures over 100 products of varying levels of design complexity. A single plant wise OH absorption rate, based on direct labour hours, is used to absorb OH costs.

In the quarter ended March, KL's Manufacturing overhead costs were:

(Rs. '000)

Equipment operation expenses	120
Equipment maintenance expenses	25
Wages paid to technicians	85
Wages paid to store men	35
Wages paid to dispatch staff	40
Total	310

During the quarter, the company reviewed its cost accounting system and concluded that absorbing OH costs to individual products on a labour hour absorption basis is meaningless. Overhead costs should be attributed to products using an Activity Based costing system and the following was identified as the most significant activities:

- (i) Receiving component consignments from suppliers
- (ii) Setting up equipment for production runs
- (iii) Quality inspections
- (iv) Dispatching goods as per customer's orders.

It was further observed that in the short-term KL's overheads are 40% fixed and 60% variable. Approximately, half the variable overheads vary in relating to direct labour hours worked and half vary in relation to the number of quality inspections.

Equipment Operation and Maintenance Expenses are apportioned as – component stores 15%, Manufacturing 70% and Goods Dispatch 15%

Technician's wages are apportioned as – Equipment Maintenance 30%, Set up Equipment for production runs 40% and Quality Inspection 30%

During the quarter :

- (i) A total of 200 direct labour hours were worked (paid at Rs. 12 per hour)
- (ii) 980 components consignments were received from suppliers.
- (iii) 1020 production Runs were set up.
- (iv) 640 quality inspections were carried out.
- (v) 420 orders were dispatched to customers.

KL's production during the quarter included components Rs, S and T. the following information is available:

Component	R	S	T
Direct labour hours worked	25	480	50
Direct material costs	Rs. 1,200	Rs. 2,900	Rs. 1,800
Component consignments received	42	24	28

Production runs	16	18	12
Quality inspections	10	8	18
Orders (Goods) dispatched	22	85	46
Quantity produced	560	12,800	2,400

Required:

- (1). Calculate the unit cost of R, S and T components, using KL's existing costs accounting system.
- (2). Explain how an ABC System would be developed using the information given. Calculate the unit cost of components R, S and T using ABC system.

Question: 5

Family store wants information about the profitability of individual product lines – Soft Drinks, Fresh Produce and Packaged food. Family Store provides the following data for a financial year for each product line.

Particular	Soft Drinks	Fresh produce	Packaged food.
Revenues	Rs. 7,93,500	Rs. 21,00,000	Rs. 12,09,900
Cost of goods sold	Rs. 6,00,000	Rs. 15,00,000	Rs. 9,00,000
Cost of bottles returned	Rs. 10,000	NIL	NIL
Number of purchase order placed	360	840	360
Number of deliveries received	300	2,190	660
Hours of shelf-stocking time	540	5,400	2,700
Items sold	1,26,000	11,04,000	3,06,000

Family Store also provides the following information for the financial year:

Activity	Description of activity	Total cost	Cost allocation base
Bottles returns	Returning of empty bottles to store	Rs. 12,000	Direct tracing to soft-drink line
Ordering	Placing of orders for purchase	Rs 1,56,000	1,560 purchase order
Delivery	Physical delivery and receipt of goods	Rs. 2,52,000	3,150 deliveries
Shelf-stocking	Stocking of goods on store shelves and on-going restocking	Rs. 1,72,800	8,640 hours of shelf-stocking time
Customer support	Assistance provide to customers including check-out	Rs. 3,07,200	15,36,000 items sold

Required:

- (i) Family store currently all support t cost (all cost other than cost of goods sold) to product lines on the basis of cost of goods sold of each product line. Calculate the operating income and operating income as % of revenues for each product line.
- (ii) If family store allocates support cost (all costs other than cost of goods sold) to product lines using an activity based costing system, calculate the operating income and operating income as % of revenues for each product line.
- (iii) Comment on your answer in requirements (a) and (b) above.

Question: 6

RST Limited specializes in the distribution of pharmaceutical products. It buys from the pharmaceutical companies and resells to each of the three different markets – (i) General Supermarket Chains (ii) Drugstore chains and (iii) Chemist Shops.

The following data for the month of April 2004 in respect of RST Limited has reported:

Particular	General Supermarket Chains	Drugstore Chains	Chemist Shop
Average revenue per delivery	Rs. 84,975	Rs. 28,875	Rs. 5,445
Average cost of goods sold per delivery	Rs. 82,500	Rs. 27,500	Rs. 4,950
Number of deliveries	330	825	2,750

In the past, RST Limited has used gross margin percentage to evaluate the relative profitability of its distribution channel. The company plans to use activity based costing for analyzing the profitability of its distribution channels. The Activity Analysis of RST limited is as under:

Activity Area	Cost driver
Customer purchase order processing	Purchase orders by customers
Line-item ordering	Line-items per purchase order
Store Delivery	Store Deliveries
Cartons dispatched to stores	Cartons dispatched to a store per delivery
Shelf-stocking at customer store	Hours of shelf-stocking

The April 2004 operating costs (other than cost of goods sold) of RST limited are Rs. 8,27,970. These operating costs are assigned to five activity areas. The cost in each area and the quantity of the cost allocation basis used in that area of April 2004 are as follows:-

Activity Area	Total costs in April 2004	Cost allocation based April 2004
Customer purchase order processing	Rs. 2,20,000	5,500 orders
Line item ordering	Rs. 1,75,560	58,520 line items
Store delivery	Rs. 1,95,250	3,905 store deliveries
Cartons dispatched to stores	Rs. 2,09,000	2,09,000 cartons
Shelf-stocking at customer store	Rs. 28,160	1,760 hours

Other data of April 2004 include the following:-

Particular	General supermarket Chains	Drugstore Chains	Chemist Shops
Total number of orders	385	990	4,125
Average number of line items per order	14	12	10
Total number of store deliveries	330	825	2,750
Average number of cartons shipped per store delivery	300	80	16

Average number of hours of shelf-stocking per store delivery	3	0.6	0.1
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- (i) Compute for April 2004 gross margin percentage for each of its three distribution channels and compute RST Limited's operating income.
- (ii) Compute the April 2004 rate per unit of the cost allocation base for each of the five activity areas.
- (iii) Compute the operating income of each distribution channel in April 2004 using the activity based costing information. Comment on the results. What new insights are available with the activity costing information?
- (iv) Describe four challenges one would face in assigning the total April 2004 operating costs of Rs. 8,27,970 to five activity areas.

Question: 7

G Ltd produces four products. A conventional product costing system is used at present. Now, use of activity based costing (ABC) system is being considered. Details of the four products and relevant information are given below for one period.

Product	A	B	C	D
Output in units	240	200	160	240
Costs per unit:	Rs.	Rs.	Rs.	Rs.
Direct material	80	100	60	120
Direct labour	56	42	28	42
Machine hours (per unit)	8	6	4	6

The products are similar and are usually produced in production runs of 20 units and sold in batches of 10 units.

The production overhead is currently absorbed by using a machine hour rate, and the total of the production overhead of 5th period has been analysed follows :-

Particular	Rs.
Machine department costs (rent, depreciation and supervision)	20,860
Set-up costs	10,500
Stores receiving	7,200
Inspection/Quality control	4,200
Output handling and dispatch	9,240
Total	52,000

The cost drivers to used for the overhead costs are as listed below:

Cost	Cost Driver
Set up costs	Number of production runs
Stores receiving	Requisitions raised
Inspection/Quality Control	Number of production runs.
Output Handling and Despatch	Order exeuted

The number of requisitions raised on the stores was 20 for each product and the number of order exeuted was 84, each order being of a batch of 10 of a product.

- Calculate the total costs for each product if all overhead costs are absorbed on a machine hour basis;
- Calculate the total costs for each product, using activity based costing system;
- Calculate and list the unit product costs from your figures in (a) and (B) above, to show the differences. Comment briefly on any conclusions, which may be drawn which could have pricing & profit implication.

Answer: costs per unit under Traditional system = Rs. 216, Rs. 202, Rs. 128 and Rs., 222 respectively. Costs per unit under ABC System = Rs. 204.09, Rs. 203.57, Rs., 143.80 Rs. 222.07 respectively. A and D are over-coasted with the traditional system while B and C are under-coasted. Cost plus pricing may not be useful for pricing.

Question: 8

New Ideas Ltd produces a product named Dunit. The standard inputs for 1 kg of Dunit are:

0.65 kg of Material L and Rs. 4 per kg.
 0.30 kg of Material M at Rs. 6 per kg.
 0.20 kg of material N at Rs. 2.50 per kg.

Dunit is produced from an entirely automated process and the production costs attributed to Dunit are only Direct Materials and Overheads. The Dunit production department works on a JIT basis and no material or finished product inventories are held.

Budgeted Overheads for Dunit Production for April are : Budgeted Production in April was 4000 kg of Dunit.

Activity	Rs.
Receipt of deliveries from suppliers (standard delivery quantity is 460 kg)	4,000
Dispatch of goods to customers (standard dispatch quantity is 100 kg)	8,000
Total	12,000

In April, 4200 kg of Dunit were produced and cost details were as under:

Material : Usage of L, M and N were 2840 kg, 1210 kg & 860 kg respectively at a total cost of Rs. 20,380.

Actual overhead cost:

12 supplier deliveries were received at a total cost of Rs. 4,400
 38 customer despatches were made at a total cost of Rs. 7,800.

The company's budget committee met recently to discuss the preparation of the financial control report for April and the following discussion occurred.

- Chief Accountant: "the overheads do not vary directly with output and are therefore by definition "fixed". They should be analysed and reported accordingly"
- Management Accountant: "the overheads do not vary with output, but they are not certainly not fixed. They should be analysed and reported on an activity basis"

- (i) Analyse the material cost variances for April into (a) Price, (b) Mixture and (c) Yield.
- (ii) Compute the ABC Recovery rates and prepare a Overhead cost variance statement using activity basis.

Answer: MPV = 390F; MMV = 151F; MYV = 341A; (2) OH Cost Variance = 200F; OH Expenditure Variance = 200A; OH Activity Variance = 400F.

Question: 9

Amar and Naveen Architects, have been using a simplified costing system in which all professional labour costs are included in a single direct cost category professional labour and all overhead costs are included in a single indirect cost category, professional support, and allocated to jobs by using professional labour hours as the allocation base.

There are two clients: Host restaurant, which required 25 hours of design work for a new addition, and Pizza Hut, which required plans for a new floor that took 401 hours to draw.

The firm has two partners, each earn a salary of Rs. 1,50,000 a year, and four associates, who each earn Rs. 60,000 per year. Each professional has 1,500 billable hours per year. The professional support is Rs. 10,80,000, which consists of Rs. 7,00,000 of design support and Rs. 3,80,000 of staff support.

Host restaurant job required five hours partner time and 20 hours associate time. Pizza hut job required 30 hours partner time and 10 hours associate time.

- Prepare job cost sheets for Host restaurant and Pizza hut using a simplified costing system with one direct and one indirect cost pool.
- Prepare job cost sheets for the two clients, using an activity based costing system with two direct cost categories – partner labour and associate labour – and two indirect cost categories – design support and staff support. Use professional labour in rupees as the cost allocation base for design support and professional labour hours for staff support.
- Determine the amount by which each job was under – or overcosted, using the simplified costing system.

Answer: cost under Traditional system. + Rs. 4,500 and Rs. 7,200 respectively; cost under ABC system = Rs. 4,046 and Rs. 9,509 respectively; First Job is overcosted by Rs. 454 and the second job is under costed by Rs. 2,309.

Question: 10

USE –n-BUY Company manufactures wood items as per customer's specific requirements. Its job-costing system uses an activity-based approach. In addition to direct costs (direct materials and direct manufacturing labour), the following indirect cost pools are identified:

Activity	Budgeted costs for the year	Cost driver used	Cost driver rate
Materials Handling	Rs. 2,00,000	Parts	Rs. 0.25 per part

Cutting and trimming	Rs. 20,00,000	Parts	Rs. 2.50 per part
Assembly	Rs. 20,00,000	Labour hours	Rs. 25.00 per hour

In January, the company catered to two orders with the following details:

Customer	Units produced	Direct Material Costs	Number of parts	Labour hours
Shukla	5000	Rs. 6,00,000	1,00,000	7,500
Greal	100	RS. 25,000	3,500	500

The direct manufacturing labour cost is Rs. 20 per hor. Assume no stocks of materials, WIP or products.

- Compute the total manufacturing costs and unit costs of the two orders.
- The upstream activities to manufacturing (design, drawings etc.) and the downstream activities (marketing, distribution and customer services) are analysed and the unit costs for the year are as under:

Customer	Upstream Activities	Downstream activities
Shukla	Rs. 60	Rs. 110
Grewal	Rs. 146	Rs. 236

Compute the full costs (sum of costs in all business function areas) per unit of the two orders.

Answer: Mfg cost per unit = Rs. 242.50 and Rs. 571.25 per unit; full costs per unit = Rs. 412.50 and Rs. 953.25

Question: 11

NPA Bank Ltd. is examining the profitability of its "Smartsave" Account, a combined savings and investment account. Depositors receive a 7% annual interest rate on their average deposit. NPA earns an interest rate spread of 3% (the difference between the rate at which it lends money and the rate it pays depositors) by lending money for residential home loan purposes at 10%. Thus, NPA would gain Rs. 60 on the interest spread if a depositor has an average "Smartsave" Account Balance of Rs. 2000 ($\text{Rs. } 2000 \times 3\% = \text{Rs. } 60$)

The Smartsave Account allows depositors unlimited use of services such as deposit, withdrawals, cheques and foreign currency drafts. Depositors with account balances of Rs. 1000 or more receive unlimited free use of services. Depositors with minimum balances of less than Rs. 1000 pay Rs. 20 a month service fee for their account.

NPA recently conducted an activity based costing study of its services and assessed the cost for six individual services. The use of these services by three customers are as follows-

Particular	ABC – Based costs per Transaction	Account Usage		
		Ramesh	Suresh	Mahesh
Deposit/Withdrawal with teller	02.50	40	50	5
Deposit/withdrawal with (ATM)	00.80	10	20	16

Deposit/Withdrawal on prearranged monthly basis	00.50	0	12	60
Cheques issued	08.00	9	3	2
Foreign Currency Drafts	12.00	4	1	6
Inquiries about account balances	01.50	10	18	9
Average Account Balance for the year		Rs. 1,100	Rs. 800	Rs. 25,000

Assume Ramesh and Mahesh always maintain a balance above Rs. 1000 while Suresh always has a balance below Rs. 1000.

- Compute the profitability of the Smartsave Account of Ramesh, Suresh And Mahesh
- Is there any cross-subsidisation among the three accounts? Why might the Bank worry about this cross-subsidisation if the Smartsave Account product offering is profitable as a whole?
- What change would you recommend for NPA's Smartsave Account?

Answer: Net Incomes = (Rs. 210); Rs. 54 and Rs. 593.20 respectively for the three accounts; Since Loss in one account is set off by profit in another, there is cross-subsidisation; The Bank may consider change in the manner of recovering from customers, adequate charges towards cost of services rendered.

Question: 12

The Hypothetical Instruments Ltd. assembles and tests a number of electronic instrument products including printed-circuit boards. Every board has various part (Diodes, Capacitors and Integrated circuits) inserted on it. It is currently producing two products – Board X and Board Y, using the same equipment and similar processes.

An extract of production and cost data for these products in one period is given below:

- | | | |
|--------------------------------|--------------|--------------|
| (a) Direct manufacturing costs | Board X (Rs) | Board Y (Rs) |
| Direct materials | 6,000 | 2,800 |
| Direct manufacturing labour | 320 | 560 |
- (b) Indirect manufacturing costs:
- Procurement (purchasing) Support (overheads) : allocated to products on the basis of 50% of their Direct Material costs
 - Production support (overheads): allocated to products on the basis of 700% of their Direct Manufacturing Labour costs.

(c)

Activity area	Indirect cost allocation rate
1. Materials handling	Rs. 20 per part
2. Machinery insertion of parts	Rs. 5 per insertion
3. Manual insertion of parts	Rs. 40 per insertion
4. Wave soldering	Rs. 500 per board
5. Rs. Quality testing	Rs. 500 per test-hour

(d) The relative use of resources of the activity areas are given below:

Activity area	Board X	Board Y
1. Materials handling *	81 parts	121 parts
2. Machinery insertion of parts	70 insertions	90 insertions
3. Manual insertion of parts	10 insertions	30 insertions
4. Wave soldering	1 board	1 board
5. Quality testing	1.5 hour	6.5 hour

The number of part includes the raw printed circuit board (counted as one part) plus the number of component parts to be inserted on the board.

Calculate the products costs of the Hypothetical Instruments Ltd. with: (a) Traditional costing system and (b) Activity-Based Costing system. Also comment on their relative suitability for decision making.

Answer : Costs of Board X and Y under Traditional System = Rs. 11,560 and Rs. 8,680 respectively. Costs under ABC system are Rs. 9,940 and Rs. 11,180. Refer Theory for importance / suitability of ABC system

TARGET COSTING AND LIFE CYCLE COSTING

Question: 1

The Golmal repair shop repairs and services machine tools. Annual summary of its costs (by activity) is Rs.

a. Materials and Labour of servicing machine tools	8,00,000
b. Reworked costs	75,000
c. Expediting costs caused by work delays	60,000
d. Materials – handling	50,000
e. Materials procurement and inspection costs	35,000
f. Preventive maintenance of equipment	15,000
g. Break-down maintenance of equipment	55,000

Required:

1. Classify each costs as value added, non value added, or in the gray area between.
2. For any cost classified in gray area, assume 65% of it is value-added and 35% is non value-added., How much of total of all seven costs is value-added and how much is non value-added?
3. The company considering the following changes at the shop: (a) introducing quality improvement programs whose net effect will be to reduce rework and expediting costs by 75% and materials and labour costs for servicing machine tools by 5%; (b) working with suppliers to reduce materials procurement and inspection costs by 20% and materials – handling costs by 25% ; and (c) increasing preventive maintenance costs by 50% to reduce break down maintenance costs by 40%. What effect would each of the programs (a), (b) and (c) have on value-added costs, non value-added costs and total costs? Comment briefly.

Answer: (1) value added costs = 8,00,000; Non value added costs (b, c and g) Rs. 1,90,000; Gray area costs (i.e. neither VA nor NVA) Rs. 1,00,000; (2) Total VA costs = 8,65,000 (79.36%) and NVA costs = Rs. 2,25,000 (20.64%) (3) Effect of changes (a) VA and NVA costs are reduced by Rs. 40,000 and Rs. 1,01,250 respectively; (b) VA and NVA costs are reduced by Rs. 12,675 and Rs. 6,825 respectively; (c) VA costs increase by Rs. 4,875 while NVA costs are reduced by Rs. 19,375

Question: 2

You are manager of XYZ Paper Mills and have recently come across a particular type of paper, which is being sold at a substantially lower rate (by another company ABC Ltd) than the price charged by your own mill. The value chain for one use of tone of such paper for ABC Ltd. is :

ABC Ltd. -----> Merchant -----> Printer -----> Customer

ABC Ltd sells this particular paper to merchant at the rate of Rs. 1,466 per tonne. ABC Ltd pays for the freight which amounts to Rs. 30 per tonne. Average returns and allowances amount to 4% of Sales and approximately equals Rs. 60 per tonne.

The Value Chain of your company, through which the paper reached the ultimate customer is similar to that of ABC Ltd. However, your mill does not sell directly to the merchant, the latter receiving the paper from huge Distribution Centre maintained by Your company at Haryana. Shipment Costs from the Mill to the Distribution Centre is Rs. 11 per tonne while the operating costs in the Distribution Centre are estimated at Rs. 25 per tonne. The return on investments required by the Distribution Centre for the investments made, amount to an estimate Rs. 58 per tonne.

Calculate the "Mill Manufacturing Target Cost" for this particular paper for XYZ LTD. Assume that the return on the investment expected by XYZ Ltd is Rs. 120 per tonne of paper.

Answer: Target Cost = Rs. 1,256 per tonne; Mill Manufacturing Target Cost = Rs. 1,162 per tonne.

Question: 3

Ramu is the managing partner of a business that has just finished building a motel. He anticipates that he will rent these rooms for 16,000 room –nights next year. All rooms are similar and will rent for the same price. The following operating costs are expected to be incurred for next year-

Variable Operating costs	Rs. 800 per room night
Fixed Costs:	
Salaries and wages	Rs. 17,50,000
Maintenance of building	Rs. 3,70,000
Other Operating and Administrative costs	Rs. 14,00,000
Total fixed costs	Rs. 35,20,000

The capital invested is Rs. 19,60,000 and the Firm expects 25% return on its investment.

- What price should be charged for a room-night?
- Market research indicates that if the price of a room-night as determined above is reduced by 10%, the number of rooms rented out will increase by 10%. Should the Firm reduce prices by 10%?

Answer: Rent = Rs. 1,063.63; Operating Income reduces by Rs. 14,50,180. Rent reduction is not advisable.

Question: 4

All-Win Co. manufactures and sells 15,000 units of a product. The full cost per unit is Rs. 200. The company has fixed its price so as to earn a 20% return on an investment of Rs. 18,00,000.

Required:

1. Calculate the selling price per unit from the above. Also, calculate the Markup % on the full cost per unit.
2. If the selling price as calculated above represents a markup % of 40% on Variable Costs per unit, calculate the Variable cost per unit.
3. Calculate the company's income if it had increased the Selling Price to Rs. 230. At this price the company would have sold 13,500 units. Should the company have increased the selling price to Rs. 230?

4. In response to competitive pressures, the company must reduce the price to Rs. 210 next year, in order to achieve sales of 15,000 units. The company also plans to reduce its investment to Rs. 16,50,000. If a 20% return on investment should be maintained, what is the target cost per unit for the next year?

Answer: selling price =Rs. 224; Mark up % = 12% on Full Cost; Variable Costs = Rs. 160 per unit; Reduction in profit due to reduced prices = Rs. 15,000. Hence, price reduction is not worthwhile; Target cost next year= Rs. 188 per unit.

Question: 5

Two identical companies A and B manufacture and sell an identical product with the same cost structure. The selling price is Rs. 10 per unit and the Variable cost is Rs. 6 per unit- same in both cases. The maximum capacity is 25,000 units in both companies and the Fixed Overheads for both A and B are Rs. 35,000. Both companies are aiming at a year end profit of Rs. 15,000.

The year is almost coming to a close. Company A has already sold 10,000 units and can make and sell additional 15,000 units while Company B has already made and sold 20,000 units. Fortunately at this juncture, Company C wants 5,000 units of the same product. It invites competitive quotations from company A and B.

Both companies A and B are keen to get the order from C. Which company, in your opinion, has the better chances of getting the offer from company C? Substantiate your answer with facts and figures.

Answer: Minimum price quoted by A and B are Rs. 8 and Rs. 6 respectively to achieve the target profit. B has a better chance of clinching the offer due to lower quote.

Question: 6

Sterling Enterprises has prepared a draft budget for the next year as follows:

Quantity	10,000 units
Sales Price per unit	30
Variable costs per unit:	
Direct material	8
Direct labour (2 hours * Rs. 3)	6
Variable overhead (2 hours * Re. 0.50)	1
Contribution per unit	15
Budgeted contribution	1,50,000
Less: Budgeted fixed costs	1,40,00
Budgeted Profit.	10,000

The Board of Directors is dissatisfied with this budget, and asks a working party to come up with an alternate budget with higher profit figures.

The working party reports back with the following suggestions that will lead to a budgeted profit of Rs. 25,000. The company should spend Rs. 28,500 on advertising, and put the sales price up to Rs. 32 per unit. It is expected that the sales volume will also rise, inspite of the price rise, to 12,000 units.

In order to achieve the extra production capacity, however, the work force must be able to reduce the time taken to make each unit of the product. It is proposed to offer a pay and productivity deal in which the wage rate per hour is increased to Rs. 4. The hourly rate for variable overhead will be unaffected.

Ascertain the revised labour time required to achieve the target profit.

Answer: Revised Labour Time = 1.75 hour per unit.

Question 7

AHA Big & Complex (ABC) Electronics make audio player model AB 100. This model has 80 components. ABC sells 10,000 units each month at Rs. 3,000 per unit. The cost of manufacturing is Rs. 2,000 per unit or Rs. 200 Lakhs per month for the production of 10,000 units. Monthly manufacturing cost incurred (in Rs. Lakhs) are as follows-

Direct material costs	100.00
Direct manufacturing labour costs	20.00
Machining costs	20.00
Testing costs	25.00
Rework costs	15.00
Ordering costs	0.20
Engineering costs	19.80

Labour is paid on piece rate basis, therefore, ABC considers direct manufacturing labour costs as variable cost.

The following additional information is available for AB 100:

- Testing and inspection time per unit is 2 hours.
- 10 per cent of AB 100 manufactured are reworked.
- It currently takes 1 hours to manufactures each unit of AB 100.
- ABC places two orders per month for each component. Each component is supplied by a different supplier.
-

ABC has identified activity cost pools and cost drivers for each activity. The cost per unit of the cost driver for each activity cost pool is as follows-

Manufacturing activity	Description of activity	Cost driver	Cost per unit of cost driver
Machining costs	Machining components	Machine hours of capacity	Rs. 200
Testing costs	Testing components and finished products. (each unit of AB 100 is tested individually)	Testing hours	Rs. 125
Rework costs	Correcting and fixing errors and defects	Units reworked	Rs. 1,500
Ordering costs	Ordering of components	Number of orders.	Rs. 125
Engineering	Designing and managing of	Engineering hrs.	RS. 198

costs	products and processes		
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Over a long – run horizon, each of the overhead costs described above varies with chosen cost drivers.

In response to competitive pressure ABC must reduce the price of its product of Rs. 2,600 and to reduce the cost by at least Rs. 400 per unit. ABC does not anticipate increase in sales due to price reduction. However, if it does not reduce price it will not be able to maintain the current sales level. Cost reduction on the existing model is almost impossible. Therefore, ABC has decided to replace AB 100 by a new model AB 200, which is a modified version of AB 100. The expected effect of design changes are:

- The number of components will be reduced to 50
- Direct material costs to be lower by Rs. 200 per unit.
- Machining time labour costs to be lower by 20%
- Direct manufacturing Laour costs to be lower by Rs. 20 per unit.
- Testing time required to be lower by 20%
- Rework to decline to 5%
- Machining capacity and engineering hours capacity to remain the same.

ABC currently outsources the rework on defective units.

Required:

- Compare the manufacturing cost per unit of AB 100 and AB 200.
- Determine the immediate effect of design change and pricing decision on the operating income of ABC.

Ignore income tax. Assume that the cost per unit of each cost driver for AB 100 continues to apply to AB 200.

Answer: manufacturing costs per unit of AB 100 and AB 200 are Rs. 2,000 and Rs. 1,614025 respectively. Operating income of the company will be reduced by Rs. 10,50,000 per month. (Alternative assumptions exist).

Question: 8

IBM Ltd manufactures and sells computers peripherals to several retail outlets throughout the country.... Amar is the manager of the printer division. Its two largest – selling printer are P1 and P2.

The manufacturing cost of each printer is calculated using IBM's activity based costing system. IBM has one direct manufacturing cost category (direct materials(and the following five indirect manufacturing cost pools:

Indirect manufacturing cost pool	Allocation Base	Allocation Rate (Rs.)
1. Material Handling	No. of parts	Rs. 1.20 per part.
2. Assembly management	Hours of assemble time	Rs. 40 per hour of assembly time

3. Machine insertion of part	No. of machine inserted part	Rs. 0.70 per machine inserted part.
4. Manual insertion of parts	No. of manually inserted parts	Rs. 2.10 per manually inserted part.
5. Quality testing	Hours of quality testing time	Rs. 25 per testing hour.

Product characteristics of P1 and P2 are as follows:

Product	P1	P2
Number of parts	Rs. 407.50	Rs. 292.10
Number of parts	85	46
Hours of assemble time	3.2	1.9
Number of machine inserted parts	48	31
Number of manually inserted parts	36	15
Hours of quality testing time	1.4	1.1

A foreign competitor has introduced products very similar to P1 and P2. Given their announced selling prices, to maintain the company's market share and profits, Amar estimated the P1 to have manufacturing cost of approximately Rs. 680 and P2 to have a manufacturing cost of approximately Rs. 390. He calls a meeting of product designers and manufacturing personnel at the printer division. They all agreed to have the Rs. 680 and Rs. 390 figures become target costs for designed version of P1 and P2 respectively. Product designers examine alternative ways of designing printers with comparable performance but lower costs. They come up with the following revised designs for P1 and P2 (termed P1 – REV and P2 – REV, respectively.)

Particulars	P1-REV	P2-REV
Direct material cost	Rs. 381.20	Rs. 263.10
Number of Parts	71	39
Hours of assembly time	2.1	1.6
Number of machine – inserted parts	59	29
Number manually – inserted parts	12	10
Hours of quality testing time	1.2	0.9

Required:

- Compute the present costs of Products P1 and P2 using ABC System
- Compute the manufacturing costs of P1-REV and P2-REV. How do they compare with the Rs. 680 and Rs. 390 target costs?
- If the allocation rate in the assembly management activity area can be reduced from Rs. 40 to Rs. 28 per assembly hour, how will this activity area cost reduction affect the manufacturing costs of P1 – REV and P2 – REV? Comment on the results.

Answer: Manufacturing costs P-1 Rs. 781.70; P-2 Rs. 504.00; P-1 REV – RS. 646.90; P-2 REV – Rs. 437.70 cost reduction target is achieved for P-1 but not for P-2. Change in assembly management activity area will reduce costs to Rs. 621.70 and Rs. 418.50 to P-1 REV and P-2 REV respectively. Further cost reduction is required for P-2 REV to meet target costs.

Question: 9

Kala Ltd manufactures many products. To compute manufacturing cost, it uses a costing system with one direct cost category (direct materials) and three indirect cost categories-

- (a) Batch-related Set-up, production Order, and Materials-handling costs, all of which vary with the number of batches.
- (b) Manufacturing operations costs that vary with machine hours.
- (c) Costs of Engineering changes that vary with the number of engineering changes made.

In response to competitive pressures at the end of year 1, product designers at the company employed value Engineering techniques to reduce manufacturing costs. Actual information of Year 1 and Year 2 follow:-

Particular	Actual results for Year 1	Actual results for Year 2
Total setup, production-order, and material-handling costs	Rs. 72,00,000	Rs. 75,00,000
Total number of batches	900	1,000
Total manufacturing operations costs	Rs. 1,21,00,000	Rs. 1,25,00,000
Total number of machine hours worked	220,000	250,000
Total costs of engineering changes	Rs. 26,40,000	Rs. 20,00,000
Total number of engineering changes made	220	200

The company wants to evaluate whether value engineering has succeeded in reducing the target manufacturing cost per unit of one of its main product, KL-69, by 12%. Actual results for 2000 and 2001 for KL-69 are:-

Particulars	Actual results for year 1	Actual result for Year 2
Units of KL- 69 produced	3,500	4,000
Direct materials costs per unit of KL-69	Rs. 1,200	Rs. 1,100
Total No. of batches required to produce KL-69	70	80
Total machine-hours required to produce LK-69	21,000	22,000
Number of engineering changes made	14	10

Required:

1. Calculate the manufacturing cost per unit of KL-69 for Year1 and Year2.
2. Did the company achieve the target manufacturing cost per unit for KL- 69? Show you calculation
- 3.

Answer: ABC Recovery Rates for the two years are – (a) set up etc. Rs. 8,000 and 7,500 per batch; (b) Manufacturing Operations Rs. 55 and Rs. 50 per machine hour;

Question: 10

End up Ltd provides the following details on its new product.

- a. Years 1 and 2: R & D Costs : Rs. 2,40,000; Design costs Rs. 1,60,000
- b. Years 3 to 6 : other functional costs:

Function	One-time costs	Costs per unit.
Production	Rs. 1,00,000	Rs. 25
Marketing	Rs. 70,000	Rs. 24
Distribution	Rs. 50,000	Rs. 16
Customer service	Rs. 80,000	Rs. 30

- c. The sale quantities during the product life cycle at various selling prices are:

Selling price per unit (Rs.)	400	480	600
Sale quantity in units	5,000	4,000	2,500

Ignoring time value of money, compute the revenues generated over the product life cycle at various prices. Which price should the company select?

Answer: Net Incomes under the three prices are Rs. 8,25,000; Rs. 8,40,000 and Rs. 5,62,500 respectively. Price of Rs. 480 per unit should be selected.

Question: 11

Advanced Turn Ltd (ATL) makes digital watches. It is preparing a product life cycle budget for a new watch, "12 to 12". Development on the new watch is to start shortly. Estimates about the product are:

Life cycle units manufactured and sold	4,00,000 watches
Selling price per watch	Rs. 40
Life cycle costs	
R & D and Design costs	Rs. 10,00,000
Manufacturing costs	
Variable costs per watch	Rs. 15
Variable costs per batch	Rs. 600
Watches per batch	500 watches
Fixed costs	Rs. 18,00,000
Marketing costs	
Variable costs per watch	Rs. 3.20
Fixed costs	Rs. 10,00,000
Distribution costs	
Variable costs per batch	Rs. 280
Watches per batch	160 watches
Fixed costs	Rs. 7,20,000
Customer service costs per watch	Rs. 1.50

Required :

- Ignoring time value of money, calculate the budgeted life cycle operating income for the new watch.
- What percentage of the budgeted total product life cycle costs will be incurred by the end of the R & D design stage?
- An analysis reveals that 80% of the budgeted total product life cycle costs of the new watch will be locked in at the end of the R&D design stages. What implications does this finding have for managing the watch's costs?
- The market research department estimates that reducing the price by Rs. 3 will increase life cycle unit sales by 10%. If unit sales increase by 10%, the company plans to increase manufacturing and distribution batch sizes by 10% as well. Assume that all variable costs per watch, per batch and all fixed costs remain same. Should the price be reduced by rs. 3? Show calculations.

Answer: (a). Net income = Rs. 24,20,000; (b) 7.36%; (c) 80% of the costs are committed when only 7% is incurred. Hence, design modifications if any, should be made sufficiently in advance since there is no looking back and the 80% costs become infructuous in case of any substantial design change; (d) income after considering price reduction = Rs. 19,12,000. Hence it is not acceptable.

Question: 12

DSS is examining the profitability and pricing policies of its software division. The software division develops software packages for engineers. It has collected data on three of its more recent packages.

- EE package for engineers. It has collected data on three of its more recent packages. –
- ME package for Mechanical Engineers.
- IE package for Industrial Engineers.

Summary details on each package over their two year cradle to grave product lives are-

Package	Selling price (Rs.)	Number of units sold	
		Year 1	Year 2
EE	250	2,000	8,000
ME	300	2,000	3,000
IE	200	5,000	3,000

Assume that no inventory remains on hand at the end of year 2. DSS is deciding which product lines to emphasise in its software division. In the past two years, the profitability of this division has been mediocre.

DSS is particularly concerned with the increase in R&D costs in several of its divisions. An analyst at the software division pointed out that for one of its most recent packages (IE) major efforts had been made to reduce R&D costs.

Last week, Kumar, the software division manager, attended a seminar on product life cycle management. The topic of life cycle reporting was discussed. He decides to use this approach in his own division. He collects the following life cycle revenue and cost information for the packages.

	Package EE	Package ME	Package IE
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		Year 1	Year 2	Year 1	Year 2	Year 1	Year 2
	Revenues	5,00,000	20,00,000	6,00,000	9,00,000	10,00,000	6,00,000
	Costs						
	R&D	7,00,000	0	4,50,000	0	2,40,000	0
	Design of product	1,85,000	15,000	1,10,000	10,000	80,000	16,000
	Manufacturing	75,000	2,25,000	1,05,000	1,05,000	1,43,000	65,000
	Marketing	1,40,000	3,60,000	1,20,000	1,50,000	2,40,000	2,08,000
	Distribution	15,000	60,000	24,000	36,000	60,000	36,000
	Customer service	50,000	3,25,000	45,000	1,05,000	2,20,000	3,88,000

Present a product life cycle income statement for each software package. Which package is most profitable and which is the least profitable? How do the three packages differ in their cost structure (the percentage of total costs in each category)?

**Answer: operating incomes = Rs. 3,50,000, Rs. 2,40,000 and Rs. (96,000) respectively.
Prepare common size statement to analyze % of each cost to sales revenue.**

JUST IN TIME

Question:1

ABC Co. Ltd. has an annual turnover of Rs. 6,00,00,000 from a range of products. Material costs and conversion costs account for 30% and 25% of the annual turnover respectively.

Other information relating to the company is as follow:

1. Stock values are currently at a constant level being:
 - Raw material stock: 10% of the material element of annual turnover.
 - Work-in-progress: 15% of the material element of annual turnover together with a proportionate element of conversion costs allowing for 60% completion of work-in progress as to conversion costs and 100% completion as to material cost. The material costs conversion cost ratio is constant for all products.
 - Finished goods stock: 12% of the material element of annual turnover together with a proportionate element of conversion cost.
2. Holding and acquisition costs of material comprise of fixed costs of Rs. 2,00,000 plus variable costs of 10 paise per Rupee of stock held.
3. Movement and control costs of work-in –progress comprise of fixed costs of Rs. 2,80,000 per annum plus variable costs of 5 paise per Rupee of material value of work-in-progress.
4. Holding and control costs of finished goods comprise fixed costs of Rs. 3,60,000 per annum plus variable costs of 2 paise per Rupee of finished goods (material cost + conversion cost)
5. Financial charges due to the impact of stock holding on working capital requirement are incurred at 20% per annum on the value of stocks held.

ABC Ltd. is considering a number of changes, which is estimated to affect stock level and costs as follows:

1. Raw material stock: Negotiate delivery from suppliers on a just in time basis. Stock levels will be reduced to 20% of the present level. Fixed costs of holding and acquiring stock will be reduced to 20% of the present level and variable costs to 7 paise per rupee of stock held.
2. Work-in-progress: convert the layout of the production area in to a dedicated cell format for each product type instead of the existing system which comprises groups of similar machines to which each product type must be take. Work-in-progress volume will be reduced to 20% of the present level with the same stage of completion as at present. Fixed costs of movement and control will be reduced to 40% of the present level and variable costs to 3 paise per rupee of material value of work-in-progress.
3. Finished goods stock: Improvement control of the flow of each product type from the production area will enable stock to be reduced to 25% of the present level. Fixed costs of holding and control will be reduced to 40% of the present level and variable costs to 1 paise per rupee of finished goods held

Calculate the annual estimated financial saving from the proposed changes in each of raw materials stock, work-in-progress and finished goods stock.

Answer: Saving in stock related costs- Raw Materials Rs. 6,02,800; WIP Rs. 9,34,800; FG Rs. 8,79,300

Question: 2

The company distributes a wide range of electrical products. One of its best selling items is a standard electric motor. The management of the star company uses the EOQ decision model to determine the optimal number of motors to order. Management now wants to determine how much safety stock to hold.

The star company estimates annual demand (300 working days) to be 30000 electric motors. Using the EOQ decision model, the company orders 3000 motors at a time. The lead time for an order is 5 days. The annual carrying costs of one motor in safety stock are Rs. 10. Management has also estimated that the stock out costs are Rs. 20 for each motor they are short. The star company has analysed the demand during 200 past reorder periods. The records indicate the following patterns:

Demand during lead time	440	480	520	560	460	500	540
No of times demanded	6	16	20	6	12	130	10

Required:

1. Determine the level of safety stock for electric motors that the star company should maintain in order to minimize expected stock out costs and carrying costs. When computing carrying costs, assume that the safety stock is on hand at all times and that there is no overstocking caused by decreases in expected demand. (consider safety stock levels of 0,20,40, and 60 units)
2. What would be the star company's new recorder point?
3. What factors should the star company have considered in estimating the stock out costs?

Answer: (i) present ROL = 500 motors; required safety stock – 40 units with minimum relevant costs of Rs. 520: (ii) New ROL = 540 motors; (iii) other consideration (a) loss of contribution due to sales foregone; (b) idle time/stock costs (c) loss of market share/ goodwill due to stockouts (d) probability of future demand based on past data; (e) Additional administration costs of purchases , if any

Question: 3

Sharp Tech Corporation (STC) is an automotive supplier that uses automatic turning machines to manufacture precision parts from steel bars. STC's inventory of raw steel average Rs. 6,00,000. The company is concerned about the costs of carrying inventory. The steel supplier is willing to supply steel in smaller lots at no additional charge. The following effects of adopting a JIT inventory program to virtually eliminate steel inventory are identified:

- Without scheduling any overtime, lost sales due to stock outs would increase by 35,000 units per year. By incurring overtime premiums of Rs. 40,000 per year. The increase in lost sales could be reduced to 20,000 units. This would be the maximum amount of overtime that would be feasible for STC.
- Two warehouses presently used for steel bar storage would no longer be needed. STC rents one warehouse from another company under an cancellable leasing arrangement at an annual costs of Rs. 60,000. The other warehouse is owned by STC and has 12,000 square feet. Three-fourths of the space in the owned warehouse could be rented for Rs. 1.50 per

square foot per year. Insurance and property tax costs totaling Rs. 14,000 per year would be eliminated.

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Long-term capital investment by STC are expected to produce an annual rate of return of 20%. STC's Budgeted income statement for the next year is as follows:

	Rs. In 000s	Rs. In 000s
Revenue 9,00,000 units		1,08,00
Cost of goods sold		
Variable costs	40,50	
Fixed costs	14,50	55,00
Gross Margin		53,00
Marketing and distribution costs		
Variable costs	9,00	
Fixed costs	15,00	24,00
Operating income		29,00

Calculate the estimated income/(loss) for STC that would result next year from the adoption of the JIT inventory control method.

Answer: overtime can be worked; Effect of JIT on profit = additional income = Rs. 37,500.
(Alternative treatments and assumptions exist)

Question:4

Z video company sells package of blank video tapes to its customers. It purchases video tapes from Y Tape Company at Rs. 140 per packet. Y Tape Company pays all freight to X video company. No incoming inspection is necessary because Y Tape Company has a superb reputation for delivery of quality merchandise. Annual demand of X video company is 13,000 packages. X video company requires 15% annual return on its investment. The purchase order lead time is 2 week. The purchase order is passed through internet and its costs Rs. 2 per order. The relevant insurance, material handling etc. is Rs. 3.10 per package per year.

X video company has to decide whether or not to shift to JIT purchasing. Y Tape Company agrees to deliver 100 packages of video tapes 130 times per year (5 times every 2 weeks) instead of existing delivery system of 1,000 packages 13 times a year, with additional amount of Re. 0.20 per package. X video company incurs no stock out under its current purchasing policy it is estimated that X video company will incur stock out cost on 50 video tape packages under a JIT purchasing policy. In the event of stock out, X video company has to rush order tape packages, which costs Rs. 4 per package. Comment whether X video company should implement JIT purchasing system.

Z co. also supplies video tapes. It agrees to supply at Rs. 136 per package under JIT delivery system. If video tape is purchased from Z co., relevant carrying cost would be Rs. 3 per package against Rs. 3.10 in case of purchasing from Y Tape Company. However Z co. does not enjoy a sterling reputation for quality. X video company anticipates the following negative aspects of purchasing tapes from Z co.

- Incurring negative aspect of purchasing tapes from Z Co.

- Average stock out of 360 tape packages per year would occur, largely resulting from late deliveries. Z co. cannot rush order at short notice. X video company anticipates lost contribution margin per package of Rs. 8 from stock out.
- Customers would likely return 2% of all packages due to poor quality of the tape and to handle this return, an additional costs of Rs. 25 per package would be incurred.

Comment on whether X Video company can place an order with Z co.

Question: 5

Kumar enterprises has decided to adopt JIT Policy for materials. The following effects of JIT policy are identified.-

- To implement JIT, the company has to modify its production and material receipt facilities at a capital cost of Rs. 6,00,000. The new facilities will require a cash operating costs Rs. 48,000 per annum.
- Raw material stockholding will be reduced from Rs. 28,00,000 to Rs. 8,00,000.
- The company can earn 15% on its long-term investments.
- The company can avoid rental expenditure on storage facilities amounting to Rs. 30,000 per annum. Property taxes and insurance amounting to s. 12,000 will be saved due to JIT programme.
- Presently there are 7 workers in the Stores Department at salary of Rs. 3,000 each per month. After implementing JIT scheme, only 2 workers will be required in this department. Of the balance 5 workers, 3 will be transfer to other departments, while 2 workers' employment will be terminated.
- Due to receipt of smaller lots of Raw Materials, there will be some disruption of production. The cost of stock-out will be Rs. 3,40,000 in the first year only. This stock-out costs can be brought down from the second year onwards.

Determine the financial impact of the JIT Policy. Is it advisable for the company to implement JIT system?