

PAPER – 4 : COST ACCOUNTING AND FINANCIAL MANAGEMENT

Part I : Cost Accounting

QUESTIONS

1. Give brief answers to the following:
 - (i) Are fixed costs per unit variable in nature? If yes, why?
 - (ii) Amongst the four alternatives provided to you below, which would be the most appropriate basis for apportioning machinery insurance costs to cost centres within a factory and why?
 1. The number of machines in each cost centre
 2. The floor area occupied by the machinery in each cost centre
 3. The value of the machinery in each cost centre
 4. The operating hours of the machinery in each cost centre.
 - (iii) Department L production overheads are absorbed using a direct labour hour rate. Budgeted production overheads for the department were Rs. 480,000 and the actual labour hours were 100,000. Actual production overheads amounted to Rs. 516,000. Based on the above data, and assuming that the production overheads were over absorbed by Rs. 24,000, what was the overhead absorption rate per labour hour?
 - (iv) When material prices fluctuate widely, what is the most suitable method (from amongst the Weighted Average, LIFO or FIFO) for pricing material?
 - (v) "A favourable production volume variance may indicate that the capacity of the plant has not been estimated properly". Do you agree with the statement? If yes, why?
 - (vi) What is the difference between a Cost centre and Cost unit.
 - (vii) Differentiate between Period cost and Product cost.
 - (viii) How is Absorption Costing different from Marginal Costing.
2. (a) Explain the concept of "ABC Analysis" as a technique of Inventory Control.
(b) ABC Ltd. distributes wide range of Water purifier systems. One of its best selling items is a standard water purifier. The management of ABC Ltd. uses the EOQ decision model to determine optimal number of standard water purifiers to order. Management now wants to determine how much safety stock to hold.

ABC Ltd. estimates annual demand (360 working days) to be 36,000 standard water purifiers. Using the EOQ decision model, the company orders 3,600 standard water purifiers at a time. The lead-time for an order is 6 days. The annual carrying cost of one standard purifier is Rs. 450. Management has also estimated the additional stock out costs would be Rs. 900 for shortage of each standard water purifier.

ABC Ltd. has analysed the demand during 200 past re-order periods. The records indicate the following patterns:

Demand during lead time	Number of times quantity was demanded
540	6
560	12
580	16
600	130
620	20
640	10
660	6
	<u>200</u>

- (i) Determine the level of safety stock for standard water purifier that the ABC Ltd. 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 decrease in expected demand (consider safety stock levels of 0, 20, 40 and 60 units).
- (ii) What would be the ABC Ltd.'s new re-order point?
- (iii) What factors ABC Ltd. should have considered in estimating stock out costs?
3. (a) What is just in time purchasing. What are its advantages?
- (b) What is spoilage? Give its treatment in Cost Accounting.
- (c) You are required to calculate the following levels for part No. 123456 from the information given there under:
- (a) Re-ordering level (b) Maximum level (c) Minimum level (d) Danger level (e) Average stock level.

The following data may be used to calculate the re-ordering quantity.

1	Total cost of purchasing relating to the order	Rs. 20
2	Number of units to be purchased during the year	5,000
3	Purchase price per unit including transportation cost	Rs. 50
4	Annual cost of storage of one unit	Rs. 5

Lead Times	Average	10 days
	Maximum	15 days
	Minimum	6 days
	Max. for emergency purchase	4 days
Rate of Consumption	Average	15 units per day
	Maximum	20 units per day

4. The following details apply to an annual budget for a manufacturing company:

Quarter	1 st	2 nd	3 rd	4 th
Working days	65	60	55	60
Production (units per working day)	100	110	120	105
Raw material purchases (% by weight of annual total)	30%	50%	20%	—
Budgeted purchases price (per kg.)	Re. 1	Rs. 1.05	Rs. 1.125	—

Quantity of raw materials per unit of production : 2 kg.

Budgeted opening stock of raw materials 4,000 kg. (cost Rs. 4,000)

Budgeted closing stock of raw materials 2,000 kg.

Issues are priced on FIFO basis.

Calculate the following budget figures:

- (a) Quarterly and annual purchases of raw material, by weight and value.
- (b) Closing quarterly stock by weight and value.

5. The three workers Govind, Ram and Shyam produced 80, 100 and 120 pieces respectively of a product 'X' on a particular day in May in a factory. The time allowed for 10 units of Product X is 1 hour and their hourly rate is Rs. 4. Calculate for each of these three workers the following:
- (1) Earnings for the day, and
 - (2) Effective Rate of Earnings per hour under: (a) Straight piece-rate, (b) Halsey Premium Bonus and (c) Rowan Premium Bonus methods of labour remuneration.
6. Calculate the monthly remuneration of three workers M, N and Q from the following data:
- (a) Standard production per month per worker – 4,000 units
 - (b) Actual production during the month:

M – 3,400 units
N – 3,000 units
Q – 3,800 units
 - (c) Piece work rate is 25 paise per unit.
 - (d) Additional production bonus is Rs. 10 for each percentage of actual production exceeding 80% standard production (e.g., 79% nil, 80% nil, 81% Rs. 10, 82% Rs. 20 and so on).
 - (e) Fixed dearness allowance, Rs 150 per month
7. The Cost Accountant of ATS Ltd. has computed labour turnover rates for the quarter ended 31st March, 2007 as 10%, 5% and 3% respectively under 'Flux method'. 'Replacement method' and 'Separation method'.
- If the number of workers replaced during that quarter is 30, find out the number of (i) workers recruited and joined, and (ii) workers left and discharged.
8. Cost Ledger of Beta Ltd. shows the following balances as on 31st March.

	Dr.	Cr.
	Rs.	Rs.
Stores ledger control A/c	6,02,870	—
Work-in-progress ledger control A/c	2,44,730	—
Finished stock ledger control A/c	5,03,890	—
Manufacturing overhead control A/c		21,050
Cost ledger control A/c	—	13,30,440
	<u>13,51,490</u>	<u>13,51,490</u>

During the next three months, the transactions that took place is as follows:

	Rs.
Finished product (at cost)	4,21,670
Manufacturing overhead incurred	1,83,020
Raw materials purchased	2,46,000
Factory wages	1,01,060
Indirect labour	43,330
Cost of sales	3,71,780
Materials issued to production	2,54,630
Sales returned at cost	10,760
Materials returned to suppliers	5,800
Manufacturing overhead charged to production	1,54,400

You are required to write up the accounts and schedule the balances stating what each balance represents.

9. The following Bill of Material relates to '1+7 ASCS', a product manufactured by ABC Ltd.

Raw Material	Standard Quantity per Unit of 1+ 7 ASCS (Nos.)	Standard Cost per Unit of raw material (Rs.)
PCB	10	1000
IC	05	900
Relay	15	100
Transformer	10	500
Rack	01	4000

The maximum capacity of the factory manufacturing this product is 200 Units per month. Budgeted Fixed Costs per month are Rs. 30,00,000. Raw material is the only variable cost. The actual raw material cost shall be computed taking the issue price of raw material for the concerned month. Budgeted selling price is Rs 60,000 per Unit.

From the following actual results of a particular month, you are required to calculate relevant variances and the actual profits made.

Actual production and sales	:	150 Units of '1+ 7 ASCS'
Actual Fixed expenses	:	Rs. 31,00,000
Actual Selling price per Unit	:	Rs. 59,000.

	Opening Stock on floor(raw material)	Closing Stock on floor(raw material)	Issues during the month (raw material)
PCB	100	200	1800 @Rs 1100/Ut
IC	50	100	900 @ Rs 1000/Ut
Relay	250	250	2250 @Rs 90/Ut
Transformer	1000	700	1200 @Rs 500/Ut
Rack	100	100	150 @ Rs 4100/Ut

10. A factory has two production processes. Normal loss in each process is 10% and scrapped units sell for Rs. 0.50 each from process 1 and Rs. 3 each from process 2. Relevant information for costing purposes relating to period 5 is as follows:

	Process 1	Process 2
Direct materials added		
Units	2,000	1,250
Cost	Rs. 8,100	Rs. 1,900
Direct labour	Rs. 4,000	Rs. 10,000
Production overhead	150% of direct labour cost	120% of direct labour cost
Output to process 2/finished goods	1,750 units	2,800 units
Actual production overhead	Rs. 17,800	

Required:

Prepare the accounts for process 1, process 2, scrap, abnormal loss or gain and production overhead.

11. The following are the details in respect of Process X and Process Y of a processing factory:

	Process X	Process Y
	Rs.	Rs.
Materials	40,000	—
Labour	40,000	56,000
Overheads	16,000	40,000

The output of Process X is transferred to Process Y at a price calculated to give a profit of 20% on the transfer price and the output of Process Y is charged to finished stock at a profit of 25% on the transfer price. The finished stock department realized Rs. 4,00,000 for the finished goods received from Process Y.

You are asked to show process accounts and total profit, assuming that there was no opening or closing work-in-progress.

12. The following standards have been set to manufacture a product:

Direct materials:	Rs.
2 units of P at Rs. 4 per unit	8.00
3 units of Q at Rs. 3 per unit	9.00
15 units of R at Re. 1 per unit	<u>15.00</u>
	32.00
Direct labour 3 hours @ Rs. 8 per hour	<u>24.00</u>
Total standard prime cost	<u>56.00</u>

The company manufactured and sold 6,000 units of the product during the year.

Direct material costs were as follows:

12,500 units of P at Rs. 4.40 per unit

18,000 units of Q at Rs. 2.80 per unit

88,500 units of R at Rs. 1.20 per unit

The company worked 17,500 direct labour hours during the year. For 2,500 of these hours the company paid at Rs. 12 per hour while for the remaining the wages were paid at the standard rate.

Calculate material price, usage variances, labour rate, and efficiency variances.

13. (a) "Cost Accounting is an aid to Management." Enumerate the main advantages of a Cost Accounting system in support of this statement.
- (b) What are the advantages of a coding system in Cost Accounting? What are the requirements for an efficient coding system?
14. Outlook Ltd. produces and sells a single product. Sales budget for calendar year 2007 by quarters is as under:

Quarter	I	II	III	IV
No of units to be sold	12,000	15,000	16,500	18,000

The year is expected to open with an inventory of 4,000 units of finished products and close with an inventory of 6,500 units.

Production is customarily scheduled to provide for two-thirds of the current quarter's sales demand plus one-third of the following quarter's demand. Thus production anticipates sales volume by about one month.

The standard cost details for one unit of the product is as follows:

Direct materials 10 kgs @ 50 paise per kg.

Direct labour 1 hour 30 minutes @ Rs. 4 per hour

Fixed overheads 1 hour 30 minutes @Rs. 2 per hour based on budgeted production volume of 90,000 direct labour hours for the year.

- (i) Prepare a Production budget for 2007, by quarters, showing the number of units to be produced and the total costs of direct material, direct labour, variable overhead and fixed overheads.
 - (ii) If the budgeted selling price per unit is Rs. 17, what would be the budgeted profit for the year as a whole?
 - (iii) In which quarter of the year, is the company expected to break-even.
15. An Automobile manufacturing company 'Bharti' produces different models of cars. The budget in respect of model 1000 for the month of September, 2006 is as under:

Budgeted output		40,000 units
Variable Costs:		(Rs. Lakhs)
Materials	264	
Labour	52	
Direct expenses	<u>124</u>	440
Fixed costs:		
Specific fixed costs	90.00	
Allocated fixed costs	<u>112.50</u>	<u>202.50</u>
Total costs		642.50
Add: Profit		<u>57.50</u>
Sales		<u>700.00</u>

Calculate:

- (i) Profit with 10% increase in selling price with a 10% reduction in sales volume.
 - (ii) Volume to be achieved to maintain the original profit after a 10% rise in material costs, at the originally budgeted selling price per unit.
16. Vivek Elementary School has a total of 150 students consisting of 5 sections with 30 students per section. The school plans for a picnic around the city during the week-end to places such as the zoo, the Niko Park, the planetarium etc. A private transport operator has come forward to lease out the buses for taking the students. Each bus will have a maximum capacity of 50 (excluding 2 seats reserved for the teachers accompanying the students). The school will employ two teachers for each bus, paying them an allowance of Rs. 50 per teacher. It will also lease out the required number of buses. The following are the other cost estimates:

	Cost per student
Breakfast	Rs. 5
Lunch	10
Tea	3
Entrance fee at zoo	2

Rent Rs. 650 per bus.

Special permit fee Rs. 50 per bus.

Block entrance fee at the planetarium Rs. 250.

Prizes to students for games Rs. 250.

No cost are incurred in respect of the accompanying teachers (except the allowance of Rs. 50 per teacher).

You are required to prepare:

- (a) A flexible budget estimating the total cost for the levels of 30, 60, 90, 120 and 150 students. Each item of cost is to be indicated separately.
- (b) Compare the average cost per student at these levels.
- (c) What will be your conclusions regarding the break-even level of student if the school proposes to collect Rs. 45 per student?

17. Rio Ltd. sells three Products X, Y and Z. The following information is provided:

Particulars		X	Y	Z
Sales volume	(units)	70,000	50,000	60,000
Selling price p.u.	(Rs.)	10	8	5
Variable cost price p.u.	(Rs.)	5	6	2.50

Fixed cost p.a. Rs. 4,00,000. Construct a multi-product profit-volume chart.

18. RXG Ltd. reports the following results for year ended 31st March, 2007.

	(Rs.)
Sales	20,00,000
Variable cost	12,00,000
Fixed cost	5,00,000
Net profit	3,00,000

Construct a Profit-Volume graph and also calculate (i) P / V ratio (ii) Break-even Point (iii) Margin of safety.

19. (a) Write a note on Operating costing.
- (b) Differentiate between Job costing and Batch costing.
20. (a) Define Joint Products and By-Products .
- (b) Differentiate between Joint-Product and By-Products.
21. (a) Define Differential Cost and Incremental Cost..
- (b) What are the various limitations of Standard costing?

SUGGESTED ANSWERS/HINTS

1. (i) Fixed costs are costs which do not change in total quantum till the time the capacity is reached. Hence if the production is less than the capacity, the fixed cost per unit do not remain as budgeted. Hence, we can say that fixed costs are variable in unit.
- (ii) The most appropriate basis for apportioning is "The value of the machinery in each cost centre" since the number of machines or the floor area or the operating hours do not give any indication of the value on which insurance amounts and premiums are decided upon.
- (iii) Since overheads are over absorbed, the budgeted quantum shall be Rs. 24,000 more than what has actually been incurred. Hence Budgeted Overheads for 1,00,000 labour hours will be Rs. 24,000 + 5,16,000 = Rs. 5,40,000 or Rs. 5.40 per labour hour

- (iv) The Weighted Average method is most suitable at times when prices fluctuate widely because this method incorporates fluctuations in prices by identifying a weighted average price rather than individual prices as used under both FIFO and LIFO.
 - (v) A favourable production variance indicates that the actual production has exceeded the budgeted capacity. The very fact that the actual production has exceeded capacity indicates that the capacity may not be budgeted at the optimum.
 - (vi) Cost Centre may be defined as a location, person, or an item of equipment for which cost may be ascertained and used for the purpose of cost control. In such a responsibility centre, the manager is responsible for costs only. Cost Unit is a unit of product, service or time (or combination of these) in relation to whom the costs may be ascertained or expressed.
 - (vii) Period costs are costs which are not assigned to products but are charged as expenses against revenue of the period in which they are incurred. All non manufacturing costs such as selling and distribution expenses, administration expenses etc are recognised as period costs. Product costs are those costs which are associated with the purchase and sale of goods (in the case of merchandise inventory). In a manufacturing scenario, inventoriable costs are known as Product Costs.
 - (viii) Absorption costing is a method of inventory costing in which the variable manufacturing costs and all fixed manufacturing costs are included as inventoriable costs. Marginal costing can be defined as "the ascertainment of marginal costs and of the effect on profit of changes in volume or type of output by differentiating between fixed and variable costs" In a Marginal costing system, fixed costs are not included as inventoriable cost.
2. (a) ABC Analysis: It is a system of selective inventory control whereby the measure of control over an item of inventory varies with its usage value. It exercises discriminatory control over different items of stores grouped on the basis of the investment involved. Usually the items of material are grouped into three categories viz; A, B and C according to their use value during a period. In other words, the high use value items are controlled more closely than the items of low use value.
- (i) 'A' Category of items consists of only a small percentage i.e., about 10% of the total items of material handled by the stores but require heavy investment i.e., about 70% of inventory value, because of either their high prices or heavy requirement.
 - (ii) 'B' Category of items comprises of about 20% of the total items of material handled by stores. The percentage of investment required is about 20% of the total investment in inventories.
 - (iii) 'C' Category of items does not require much investment. It may be about 10% of total inventory value but they are nearly 70% of the total items handled by stores.

'A' category of items can be controlled effectively by using a regular system, which ensures neither over – stocking nor shortage of materials for production. Such a system plans its total material requirements by making budgets. The stocks of materials are controlled by fixing certain levels like maximum level, minimum level and re-order level etc. A reduction in inventory management costs is achieved by determining economic order quantities after taking into account ordering cost and carrying cost. To avoid shortages and to minimize heavy investment of funds in inventories, the techniques of value analysis, variety reduction, standardization etc. are used along with aforesaid techniques.

In the case of 'B' category of items, as the sum involved is moderate, therefore, the same degree of control as applied in 'A' category of items is not warranted. The order for the items, belonging to this category may be placed after reviewing their situation periodically. This category of items can be controlled by routine control measures.

For 'C' category of items, there is no need of exercising constant control. Orders for items in this group may be placed either after six months or once in a year, after ascertaining consumption requirements.

- (b) (i) Determination of the level of safety stock to minimize expected stock out costs and carrying costs

Average daily usage

$$= \frac{\text{Annual demand}}{\text{No. of working days}}$$

$$= \frac{36,000 \text{ units}}{360 \text{ days}} = 100 \text{ units per day}$$

$$\begin{aligned} \text{Re-order point} &= \text{Average daily usage} \times \text{Lead time} \\ &= 100 \text{ units per day} \times 6 \text{ days} = 600 \text{ units} \end{aligned}$$

$$\text{Possible safety stock level} = \text{Possible demand} - \text{Reorder point}$$

Probability of demand during lead-time is

Demand during lead time	No. of time quantity was demanded	Probability
540	6	0.03
560	12	0.06
580	16	0.08
600	130	0.65
620	20	0.10
640	10	0.05
660	<u>6</u>	<u>0.03</u>
	<u>200</u>	<u>1.00</u>

Safety	Demand	Stock-out	Prob. of	Relevant	No. of	Expected	Relevant	Total
Stock	realizations	in units	stock-out	stock-out	orders	stock-out	carrying	Relevant
level	resulting	(3)=(2) —		(5)=(3)× 900	per year	(7)= (4)×(5) × (6)	(8) = (1) ×	costs
(units)	in Stock-outs	600 – (1)		(Rs.)			Rs.450	(9)=(7)+(8)
(1)	(2)	(3)	(4)	(5)	(6)	(Rs.)	(Rs.)	(Rs.)
0	620	20	0.10	18,000	10	18,000		
	640	40	0.05	36,000	10	18,000		
	660	60	0.03	54,000	10	<u>16,200</u>		
		—	—	—	—	<u>52,200</u>	0	52,200
20	640	20	0.05	18,000	10	9,000		
	660	40	0.03	36,000	10	<u>10,800</u>		
						<u>19,800</u>	9,000	28,800
40	660	20	0.03	18,000	10	5,400	18,000	23,400
60	Nil	Nil	—	—	—	0	27,000	27,000

Decision:

Safety stock of 40 units would minimize ABC Ltd.'s total expected stock-out and carrying cost.

$$\begin{aligned}
 \text{(ii) New Re-order Point} &= \text{ROL} + \text{Safety Stock} \\
 &= 600 \text{ units} + 40 \text{ units} \\
 &= 640 \text{ units}
 \end{aligned}$$

(iii) Factors to consider in estimating stock-out cost

- Expediting an order from supplier (additional ordering cost plus any associated transportation cost).
- Loss of sales due to stock out (opportunity cost in terms of lost contribution margin on the sales not made due to item not being in stock plus any contribution margin lost on future sales due to customer will be caused by the stock out.)

3. (a) Just in time (JIT) purchases means the purchase of goods or materials such that delivery immediately precedes their use.

Advantage of JIT purchases:

Main advantages of JIT purchases are as follows:

1. The suppliers of goods or materials co-operates with the company and supply requisite quantity of goods or materials for which order is placed before the start of production.
 2. JIT purchases results in cost savings for example, the costs of stock out, inventory carrying materials handling and breakage are reduced.
 3. Due to frequent purchases of raw materials, its issue price is likely to be very close to the replacement price. Consequently the method of pricing to be followed for valuing material issues becomes less important for companies using JIT purchases.
 4. JIT purchasing are now attempting to extend daily deliveries to as many areas as possible so that the goods spend less time in warehouses or on store shelves before they are exhausted.
- (b) Spoilage: It refers to materials which are badly damaged in manufacturing operations and they cannot be rectified economically and hence taken out of the process to be disposed off in some manner without further processing. Spoilage may be normal or abnormal.
- (i) Normal spoilage: It arises under efficient operating conditions. It is an inherent result of the particular process and thus uncontrollable in the short run. The normal spoilage costs are included in costs either by charging the loss due to spoilage to the production order or by charging it to production overhead so that it is spread over all the products. Any value realised from spoilage is credited to production order or production overhead account as the case may be.
 - (ii) Abnormal spoilage: Abnormal spoilage is that which arises due to causes not inherent in the manufacturing process. The cost of abnormal spoilage is charged to costing profit and loss account.
- (c) (a) Re-ordering level = Maximum usage $\times$ maximum lead time
 $= 20 \times 15 = 300 \text{ units.}$
- (b) Maximum level = Re-ordering level + Re-order quantity (W.N.1) – Minimum usage
 $(\text{W.N. 2}) \times \text{Minimum lead time} = 300 + 200 - 10 \times 6 = 440 \text{ units}$
- (c) Minimum level = Re-ordering level – Average consumption
 $\times \text{Average lead time} = 300 - 15 \times 10 = 150 \text{ units}$

- (d) Danger level = Average consumption × Maximum lead time for emergency Purchases
 $= 15 \times 4 = 60 \text{ units}$
- (e) Average stock level = Minimum level + $\frac{1}{2} \times \text{Re-order quantity}$
 $= 150 \times \frac{1}{2} \times 200 = 250 \text{ units}$

Working Note:

$$1. \text{ Re-order Quantity} = \sqrt{\frac{2QR}{CP}} = \sqrt{\frac{2 \times 5,000 \times 20}{10\% \text{ of } 50}} = 200 \text{ units}$$

Where, Q = Annual purchase = 5,000; R = Ordering cost = Rs. 20

C = Storage cost % of P = Price per unit = Rs. 50.

2. Minimum Usage has been calculated as follows:

$$\text{Average Usage} = \frac{\text{Minimum Usage} + \text{Maximum Usage}}{2}$$

or $2 \times \text{Average Usage} = \text{Minimum Usage} + \text{Maximum Usage}$

$2 \times 15 \text{ units} = \text{Minimum Usage} + 20 \text{ units}$

Minimum usage = 30 units – 20 units = 10 units.

4. (a) Computation of quarterly and Annual Purchases:

Consumption:

1 st Quarter	$65 \times 100 \times 2 \text{ kg.}$	=	13,000 kg.
2 nd Quarter	$60 \times 110 \times 2 \text{ kg.}$	=	13,200 kg.
3 rd Quarter	$55 \times 120 \times 2 \text{ kg.}$	=	13,200 kg.
4 th Quarter	$60 \times 105 \times 2 \text{ kg.}$	=	<u>12,600 kg.</u>
			<u>52,000 kg.</u>

Annual Purchases:

Consumption	52,000 kg.
Add: Closing Stock	<u>2,000 kg.</u>
	54,000 kg.
Less: Opening Stock	<u>4,000 kg.</u>
	<u>50,000 kg.</u>

Quarterly Purchases:

			Rs.
1 st quarter	30 % of 50,000 kg. or	15,000 kg. @ Re. 1.00	15,000
2 nd quarter	50 % of 50,000 kg. or	25,000 kg. @ Rs. 1.05	26,250
3 rd quarter	20 % of 50,000 kg. or	<u>10,000 kg. @ Rs. 1.125</u>	<u>11,250</u>
		<u>50,000 kg.</u>	<u>Rs. 52,500</u>

(b) Closing Quarterly Stock:

Quarter	Purchase			Issue (FIFO)			Closing Stock			
	Weight	Rate	Value	Weight	Rate	Value	Weight	Rate	Value	
	t Kg.	Rs.	Rs	Kg.	Rs.	Rs.	Kg.	Rs.	Rs.	
Opening Stock	--	--	--	--	--	--	4,000	1.00	4,000	
1 st quarter	15,000	1.00	15,000	13,000	1.00	13,000	6,000	1.00	6,000	
2 nd quarter	25,000	1.05	26,250	13,200	$\left[\begin{array}{l} 6,000 \\ 7,200 \end{array} \right]$	$\left[\begin{array}{l} 6,000 \\ 7,560 \end{array} \right]$	17,800	1.05	18,690	
3 rd quarter	10,000	1.125	11,250	13,200	1.05	13,860	14,600	$\left[\begin{array}{l} 4,600 \\ 10,000 \end{array} \right]$	$\left[\begin{array}{l} 4,830 \\ 11,250 \end{array} \right]$	16,080
4 th quarter	--	--	--	12,600	$\left[\begin{array}{l} 4,600 \\ 8,000 \end{array} \right]$	$\left[\begin{array}{l} 4,830 \\ 9,000 \end{array} \right]$	2,000	1.125	2,250	

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5. Statement of Earnings

	Govind	Ram	Shyam
(i) Production (units)	80.00	100	120
(ii) Time allowed (Hours @ 10 pieces per hour)	8.00	10	12
(iii) Piece rate (Rs. 4 ÷ 10)	0.40	0.40	0.40
(iv) Time taken (Assumed 1 day = 8 hours)	8.00	8	8
(v) Time saved	0	2	4
Earnings per day (Rs.)			
(a) Straight Piece Rate	80 × 0.4 = 32.00	100 × 0.4 = 40.00	120 × 0.4 = 48.00
(b) Halsey Premium Bonus (See Note)	32.00	36.00	40.00
(c) Rowan Premium Bonus (See Note)	32.00	38.40	42.60

Effective Rate of Earning per hour (Earning ÷ Hours)

	Rs.	Rs.	Rs.
(a) Straight Piece Rate	4.00	5.00	6.00
(b) Halsey Premium Bonus	4.00	4.50	5.00
(c) Rowan Premium Bonus	4.00	4.80	5.33

Notes:

1. Halsey Premium Bonus

Wages = (Time taken + 50% of time saved) × Time rate

Govind = (8 + 0) × Rs. 4 = Rs. 32

Ram = (8 + 1) × Rs. 4 = Rs. 36

Shyam = (8 + 2) × Rs. 4 = Rs. 40

2. Rowan Premium Bonus

$$\text{Wages} = \text{Time taken} \times \text{Rate} + \left(\frac{\text{Time saved}}{\text{Time allowed}} \times \text{Time taken} \times \text{Rate} \right)$$

$$\text{Govind} = 8 \times 4 + \left(\frac{0}{8} \times 8 \times 4 \right) = \text{Rs. } 32$$

$$\text{Ram} = 8 \times 4 + \left(\frac{2}{10} \times 8 \times 4 \right) = \text{Rs. } 38.40$$

$$\text{Shyam} = 8 \times 4 + \left(\frac{4}{12} \times 8 \times 4 \right) = \text{Rs. } 42.67$$

6. Statement of Monthly Remuneration

Worker	Standard production (units)	Actual production (units)	% of actual to standard production	Piece wages @ Rs. 0.25	Bonus	D.A.	Total earnings
					Rs.	Rs.	Rs.
M	4,000	3,400	85%	850	50*	150	1,050
N	4,000	3,000	75%	750	—	150	900
Q	4,000	3,800	95%	950	150**	150	1,250

*Additional 5% (85% – 80%), So Bonus is Rs. $10 \times 5 = \text{Rs. } 50$.

**Additional 15% (95% – 80%), So Bonus is Rs. $10 \times 15 = \text{Rs. } 150$.

7. Average number of workers on payroll:

$$\text{Labour turnover rate (Replacement method)} = \frac{\text{Number or workers replaced}}{\text{Average number on pay roll}} \times 100$$

$$\text{or, } \frac{5}{100} = \frac{30}{\text{Average number on pay roll}}$$

$$\text{or, Average number of workers on payroll} = \frac{30 \times 100}{5} = 600.$$

Number of workers left and discharged:

$$\text{Labour turnover rate (Separation method)} = \frac{\text{Number separated}}{\text{Average number on payroll}} \times 100$$

$$\text{or, } \frac{3}{100} = \frac{\text{Number separated}}{600}$$

$$\text{or, Number of workers separated (i.e., left and discharged)} = \frac{3 \times 600}{100} = 18.$$

Number of workers recruited and joined:

$$\text{Labour turnover rate (Flux method)} = \frac{\text{Number separated} + \text{Number recruited and joined}}{\text{Average number on payroll}} \times 100$$

$$\text{or, } \frac{10}{100} = \frac{18 + \text{Number recruited and joined}}{600}$$

$$\text{or, Number of workers recruited and joined} = \frac{600 \times 10}{100} - 18 = 42.$$

8.

COST LEDGER

Dr.	Cost Ledger Account		Cr.
Particulars	Rs.	Particulars	Rs.
To Stores ledger control A/c	5,800	By Balance b/d	13,30,440
To Finished stock ledger control A/c	3,71,780	By Stores ledger control A/c	2,46,000
To Balance c/d	15,37,030	By Wages control A/c	1,01,060
		By Works overhead control A/c	43,330
		By Works overhead control A/c	1,83,020
		By Finished stock ledger control A/c	10,760
	<u>19,14,610</u>		<u>19,14,610</u>
		By Balance b/d	15,37,030

Dr.	Stores Ledger Control Account		Cr.
Particulars	Rs.	Particulars	Rs.
To Balance b/d	6,02,870	By Cost ledger control A/c	5,800
To Cost ledger control A/c	2,46,000	By Work-in-progress control A/c	2,54,630
		By Balance c/d	5,88,440
	<u>8,48,870</u>		<u>8,48,870</u>
To Balance b/d	5,88,440		

Dr.	Manufacturing Overhead Control Account		Cr.
Particulars	Rs.	Particulars	Rs.
To Cost ledger control A/c	1,83,020	By Balance b/d	21,050
To Cost ledger control A/c	43,330	By Work-in-progress control A/c	1,54,400
		By Balance c/d	50,900
	<u>2,26,350</u>		<u>2,26,350</u>
To Balance b/d	50,900		

Dr.	Work-in-progress Control Account		Cr.
Particulars	Rs.	Particulars	Rs.
To Balance b/d	2,44,730	By Finished stock ledger control A/c	4,21,670
To Wages control A/c	1,01,060	By Balance c/d	3,33,150
To Stores ledger control A/c	2,54,630		
To Works overhead control A/c	1,54,400		
	<u>7,54,820</u>		<u>7,54,820</u>
To Balance b/d	<u>3,33,150</u>		

Dr.	Finished Stock Ledger Control Account				Cr.
Particulars		Rs.	Particulars		Rs.
To Balance b/d		5,03,890	By Cost ledger control A/c		3,71,780
To Work-in-progress		4,21,670	By Balance c/d		5,64,540
To Cost ledger control A/c		<u>10,760</u>			
		<u>9,36,320</u>			<u>9,36,320</u>
To Balance b/d		5,64,540			

Trial Balance

	Dr.	Cr.
	Rs.	Rs.
Cost ledger control account	—	15,37,030
Stores ledger control account	5,88,440	—
Mfg. overhead control account	50,900	—
W.I.P. control account	3,33,150	—
Finished stock ledger control account	<u>5,64,540</u>	<u>—</u>
	<u>15,37,030</u>	<u>15,37,030</u>

9. Direct Material Control Statement for Material Variances

Raw Material	Std Qty (No.)	Std Cost	*SQAP	*AQAP	Actual Cost/Unit (Rs.)	Usage Variance (Rs.)	Price Variance (Rs.)
PCB	10	1000	1,500	1,700	1,100	(2,00,000)	(1,70,000)
IC	05	900	750	850	1,000	(90,000)	(85,000)
Relay	15	100	2,250	2,250	90	Nil	22,500
Transformer	10	500	1,500	1,500	500	Nil	Nil
Rack	01	4000	150	150	4,100	Nil	(15,000)
Total →						(2,90,000)	(2,47,500)

*AQAP stands for Actual Quantity on Actual Production

*SQAP stands for Standard Quantity on Actual Production

Production Volume Variance

Budgeted Fixed Costs : Rs 30,00,000

Budgeted Fixed Cost per Unit Rs 15,000 per Unit

Unutilised Capacity (150 – 200)Units = 50 Units

Variance Rs 15,000 × 50 Units =(Rs 7,50,000)

Fixed Expense Variance

Budgeted Fixed Expense less Actual Fixed Expense

Or (Rs 1,00,000)

Selling Price Variance

Actual Sales less Standard Price on Actual Sales

Or (Rs 88,50,000 – 90,00,000) = (Rs 1,50,000)

Statement of Profit

Standard Profit on actual Sales	Rs. 30,00,000
Usage Variance	(Rs. 2,90,000)
Price Variance	(Rs. 2,47,500)
Production Volume Variance	(Rs. 7,50,000)
Fixed Expense Variance	(Rs. 1,00,000)
Selling Price Variance	(Rs 1,50,000)
Actual Profit	Rs. 14,62,500

10.

Output and losses

	Process 1	Process 2
	Units	Units
Output	1,750	2,800
Normal loss (10% of input)	200	300
Abnormal loss	50	—
Abnormal gain	—	(100)
	2,000	3,000*

* 1,750 units from Process 1 + 1,250 units input to process.

Cost per unit of output and losses

	Process 1	Process 2
	Rs.	Rs.
Cost of input		
–material	8,100	1,900
–from process 1	— (1,750 × Rs. 10)	17,500
–labour	4,000	10,000
–overhead (150% × Rs. 4,000)	6,000 (120% × Rs. 10,000)	12,000
	18,100	41,400
Less scrap value of normal loss (200 × Rs 0.50)	(100) (300 × Rs 3)	(900)
	18,000	40,500
Expected output		
90% of 2,000	1,800	
90% of 3,000		2,700
Cost per unit		
Rs. 18,000 ÷ 1,800	Rs. 10	
Rs. 40,500 ÷ 2,700		Rs. 15

Total cost of output and losses

	Process 1		Process 2	
	Rs.		Rs.	
Output ($1,750 \times \text{Rs. } 10$)	17,500	($2,800 \times \text{Rs. } 15$)	42,000	
Normal loss ($200 \times \text{Rs. } 0.50$)*	100	($300 \times \text{Rs. } 3$)*	900	
Abnormal loss ($50 \times \text{Rs. } 10$)	500		—	
	<u>18,100</u>		<u>42,900</u>	
Abnormal gain	—	($100 \times \text{Rs. } 15$)	(1,500)	
	<u>18,100</u>		<u>41,400</u>	

* Normal loss is valued at scrap value only.

Complete accounts

PROCESS 1 ACCOUNT

	Units	Rs.		Units	Rs.
Direct material	2,000	8,100	Scrap a/c (normal loss)	200	100
Direct labour		4,000	Process 2 a/c	1,750	17,500
Production overhead a/c		<u>6,000</u>	Abnormal loss a/c	<u>50</u>	<u>500</u>
	<u>2,000</u>	<u>18,100</u>		<u>2,000</u>	<u>18,100</u>

PROCESS 2 ACCOUNT

	Units	Rs.		Units	Rs.
Direct materials					
From process 1	1,750	17,500	Scrap a/c (normal loss)	300	900
Added materials	1,250	1,900	Finished goods a/c	2,800	42,000
Direct labour		10,000			
Production overhead		12,000			
	3,000	41,400			
Abnormal gain	<u>100</u>	<u>1,500</u>			
	<u>3,100</u>	<u>42,900</u>		<u>3,100</u>	<u>42,900</u>

ABNORMAL LOSS ACCOUNT

	Rs.		Rs.
Process 1 (50 units)	500	Scrap a/c: sale of scrap of extra loss (50 units)	25
		Profit and loss a/c	<u>475</u>
	<u>500</u>		<u>500</u>

ABNORMAL GAIN ACCOUNT

	Rs.		Rs.
Scrap a/c (loss of scrap revenue due to abnormal gain, 100 units $\times$ Rs. 3)	300	Process 2 abnormal gain (100 units)	1,500
Profit and loss a/c	<u>1,200</u>		
	<u>1,500</u>		<u>1,500</u>

SCRAP ACCOUNT

	Rs.		Rs.
Scrap value of normal loss		Cash a/c – cash received	
Process 1 (200 units)	100	Loss in process 1(250 units)	125
Process 2 (300 units)	900	Loss in process 2 (200 units)	600
Abnormal loss a/c (process 1)	<u>25</u>	Abnormal gain a/c (process 2)	<u>300</u>
	<u>1,025</u>		<u>1,025</u>

PRODUCTION OVERHEAD ACCOUNT

	Rs.		Rs.
Overhead incurred	17,800	Process 1 a/c	6,000
Over-absorbed overhead a/c (or P & L a/c)	<u>200</u>	Process 2 a/c	12,000
	<u>18,000</u>		<u>18,000</u>

11. Dr.	Process X Account		Cr.
	Rs.		Rs.
To Materials	40,000	By Transfer to Process Y A/c	1,20,000
To Labour	40,000		
To Overheads	<u>16,000</u>		
	96,000		
To Profit (20% of transfer price, i.e., 25% of cost)	<u>24,000</u>		
	1,20,000		<u>1,20,000</u>

Dr.	Process Y Account		Cr.
	Rs.		Rs.
To Transfer from Process X A/c	1,20,000	By Transfer to Finished	
To Labour	56,000	Stock A/c	2,88,000
To Overhead	<u>40,000</u>		
To Profit (25% of transfer price i.e.,	2,16,000		
$33\frac{1}{3}\%$ of cost)	<u>24,000</u>		
	2,88,000		<u>2,88,000</u>

Statement of Total Profit

	Rs.
Profit from Process X	24,000
Profit from Process Y	72,000
Profit on Sales (4,00,000 – 2,88,000)	<u>1,12,000</u>
Total Profit	<u>2,08,000</u>

12. Standard Quantity of Materials for Actual Output:

P	$6,000 \times 2$	12,000 units
Q	$6,000 \times 3$	18,000 units
R	$6,000 \times 15$	90,000 units

Standard hours for Actual Output:

$6,000 \times 3$	18,000 units
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Material price Variance:

(Standard Price – Actual Price) × Actual Quantity		Rs.
P	$(Rs. 4.00 - Rs. 4.40) \times 12,500$	5,000 A
Q	$(Rs. 3.00 - Rs. 2.80) \times 18,000$	3,600 F
R	$(Rs. 1.00 - Rs. 1.20) \times 88,500$	<u>17,700 A</u>
		<u>19,100 A</u>

Material Usage Variance:

(Standard Usage – Actual Usage) × Standard Price

P	$(12,000 - 12,500) \times Rs. 4.00$	2,000 A
Q	$(18,000 - 18,000) \times Rs. 3.00$	Nil
R	$(90,000 - 88,500) \times Rs. 1.00$	<u>1,500 F</u>
		<u>500 A</u>

Labour Rate Variance:

(Standard Rate – Actual Rate) × Actual hours

$(Rs. 8.00 - Rs. 12.00) \times 2,500$	10,000 A
$(Rs. 8.00 - Rs. 8.00) \times 15,000$	<u>Nil</u>
	<u>10,000 A</u>

Labour Efficiency Variance:

(Standard hours – Actual hours) × Standard Rate

$(18,000 - 17,500) \times Rs. 8.00$	<u>4,000 F</u>
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13. (a) Advantages of a Cost Accounting system:

Important advantages of a Cost Accounting System may be listed as below:

1. A good Cost Accounting System helps in identifying unprofitable activities, losses or inefficiencies in any form.
2. The application of cost reduction techniques, operations research techniques and value analysis technique, helps in achieving the objective of economy in concern's operations. Continuous efforts are being made by the business organisation for finding new and improved methods for reducing costs.
3. Cost Accounting is useful for identifying the exact causes for decrease or increase in the profit/loss of the business. It also helps in identifying unprofitable products or product lines so that these may be eliminated or alternative measures may be taken.
4. It provides information and data to the management to serve as guides in making decisions involving financial considerations. Guidance may also be given by the Cost Accountant on a host of problems such as, whether to purchase or manufacture a given component, whether to accept orders below cost, which machine to purchase when a

number of choices are available.

5. Cost Accounting is quite useful for price fixation. It serves as a guide to test the adequacy of selling prices. The price determined may be useful for preparing estimates or filling tenders.
6. The use of cost accounting technique viz., variance analysis, points out the deviations from the pre-determined level and thus demands suitable action to eliminate such deviations in future.
7. Cost comparison helps in cost control. Such a comparison may be made from period to period by using the figures in respect of the same unit of firms or of several units in an industry by employing uniform costing and inter-firm comparison methods. Comparison may be made in respect of costs of jobs, processes or cost centres.
8. A system of costing provides figures for the use of Government, Wage Tribunals and other bodies for dealing with a variety of problems. Some such problems include price fixation, price control, tariff protection, wage level fixation, etc.
9. The cost of idle capacity can be easily worked out, when a concern is not working to full capacity.
10. The use of Marginal Costing technique may help the executives in taking short term decisions. This technique of costing is highly useful during the period of trade depression, as the orders may have to be accepted during this period at a price less than the total cost.
11. The marginal cost has linear relationship with production volume and hence in formulating and solving "Linear Programming Problems", marginal cost is useful.

(b) Advantages of a coding system

The following are some of the advantages of a well-designed coding system:

- (a) Since the code is, most of the times, briefer than a description, it saves time when systems are worked upon manually and in case the system is computerised it reduces the data storage capacity. The illustration above demonstrates this advantage very clearly.
- (b) A code helps in reducing ambiguity. In case two professionals understand the same item differently a code will help them objectively.
- (c) Unlike detailed descriptions, a code facilitates data processing in computerised systems.

The requirements for an efficient coding system

- (a) Every number used in the code should be unique and certain, i.e. it should be easily identified from the structure of the code.
- (b) Elasticity and comprehensiveness is an absolute must for a well designed coding system. It should be possible to identify a code for every item and the coding system should be capable of expanding to accommodate new items.
- (c) The code should be brief and meaningful.
- (d) The maintenance of the coding system should be centrally controlled. It should not be possible for individuals to independently add new codes to the existing coding system.
- (e) Codification systems should be of the same length. This makes errors easier to spot and it assists computerised data processing.

14.

Production budget
(For the year 2007 by quarters)

(a) Units to be produced in each quarters

	Quarters				
	I	II	III	IV	Total
2/3 of current quarter's sales demand	8,000	10,000	11,000	12,000	41,000
1/3 of the following quarter demand*	<u>5,000</u>	<u>5,500</u>	<u>6,000</u>	<u>6,500</u>	<u>23,000</u>
	<u>13,000</u>	<u>15,500</u>	<u>17,000</u>	<u>18,500</u>	<u>64,000</u>

(b) Statement showing direct material, variable overhead and fixed overhead

	Quarters				
	I	II	III	IV	Total
Units to be produced	13,000	15,500	17,000	18,500	64,000
Direct Material @ Rs. Per unit (Refer to Note 1)	Rs. 65,000	Rs. 77,500	Rs. 85,000	Rs. 92,500	Rs. 3,20,000
Direct Labour @ Rs. 6 per Unit (Refer to Note 2)	78,000	93,000	1,02,000	1,11,000	3,84,000
Variable overhead 1251.50 per unit (Refer to Note 3)	19,500	23,250	25,500	27,750	96,000
Fixed Overhead (Refer to Note 4)	<u>45,000</u>	<u>45,000</u>	<u>45,000</u>	<u>45,000</u>	<u>1,80,000</u>
	<u>2,07,500</u>	<u>2,38,750</u>	<u>2,57,500</u>	<u>2,76,250</u>	<u>9,80,000</u>

(ii) Budgeted profit for the whole year

Sales (61,500** units @Rs. 17 per unit)	Rs.10,45,500
Less: Total variable cost per unit (61.500** unit @ Rs. 12.50 per unit)	Rs. 7,68,705
	<u>2,76,750</u>
Less: Fixed cost	<u>1,80,000</u>
Profit for the whole year	<u>96,750</u>

Variable cost per unit:	Rs.
Direct material cost (Refer to Note 1)	5.00
Direct labour cost (Refer to Note 2)	6.00
Variable cost (Refer to Note 3)	<u>1.50</u>
	<u>12.50</u>

- (iii) BES x P/V ratio = Fixed cost
 Or BES x (Rs. 17-12.50)/17 = Rs. 1,80,000
 or Break-even sales (volume) = 6,80,000.

BE Sales in units = Rs. 6,80,000 ÷ 17 or 40,000 units.

The total sales by the end of third quarter will be 43,500 units, i.e., 12,000 + 15,000 + 16,500, therefore, the company will break-even in the later part of the third quarter.

Working Notes:

1. Direct material cost = 10 lbs @ Re. 0.50 per lb = Rs. 5.00 per unit.
2. Direct labour per unit = 1 hr. 30 minutes @ Rs. 4 per hour = Rs. 6 per unit.
3. Variable overhead per unit = 1 hr. 30 minutes @ Re 1 per hour = Rs. 1.50 unit
4. Fixed Overhead

Budgeted production volume is 90,000 direct labour hours for the year @ Rs. 2 per hour i.e. Rs. 1,80, 000 for the year. This fixed overhead is spread over the four quarters equally.

* In first three quarters; inventory given for the fourth.

** Sales for the year is given i.e. 12,000+ 15,000+16,500+18,000=61,500 unit.

15.		Rs.
Present selling price	(Rs. 700 lakhs /40,000 units)	1,750
Add: 10% increase	(1,750 x 10/100)	<u>175</u>
Revised selling price		<u>1,925</u>
		Units
Present sales volume		40,000
Less: 10% decrease	(40,000 x 10/100)	<u>4,000</u>
Revised sales volume		<u>36,000</u>
Revised sales revenue = 36,000 unit x Rs. 1,925 = Rs. 693 lakhs		
		(Rs.)
Materials		660
Labour		130
Direct expenses		<u>310</u>
Total variable cost		<u>1,100</u>
Profitability Statement		(Rs. Lakhs)
Sales		693.00
Less: Variable cost	(36,000 units × Rs. 1,100)	<u>396.00</u>
Contribution		297.00
Less: Fixed cost		202.50
Profit		94.50
Materials	(Rs. 660 + 10% of Rs. 660)	726
Labour		130
Direct expenses		<u>310</u>
Total variable cost p.u.		<u>1,166</u>
Calculation of sales Volume to be achieved to maintain the original profit of Rs. 57.50 lakhs.		
		(Rs. p.u.)
Selling price		1,750
Less: Variable cost		<u>1,166</u>
Contribution p.u.		<u>584</u>

$$\text{Desired Sales} = \frac{\text{Fixed cost} + \text{Desired profit}}{\text{Contribution p.u.}} = \frac{\text{Rs. 202.50 lakhs} + \text{Rs. 57.50 lakh}}{\text{Rs. 584 p.u.}} = 44,521 \text{ units}$$

16. (a) Flexible Budget for different levels

No. of Students	<u>30</u>	<u>60</u>	<u>90</u>	<u>120</u>	<u>150</u>
VARIABLE COSTS					
Breakfast	Rs. 150	300	450	600	750
Lunch	300	600	900	1,200	1,500
Tea	90	180	270	360	450
Entrance fee	<u>60</u>	<u>120</u>	<u>180</u>	<u>240</u>	<u>300</u>
Sub-total (A)	<u>600</u>	<u>1,200</u>	<u>1,800</u>	<u>2,400</u>	<u>3,000</u>
Variable cost/unit	20	20	20	20	20
SEMI-VARIABLE COST					
Bus rent	650	1,300	1,300	1,950	1,950
Special permit fee	50	100	100	150	150
Allowance for teachers	<u>100</u>	<u>200</u>	<u>200</u>	<u>300</u>	<u>300</u>
Sub-total (B)	<u>800</u>	<u>1,600</u>	<u>1,600</u>	<u>2,400</u>	<u>2,400</u>
FIXED COST					
Block entrance fee	250	250	250	250	250
Prize to students	<u>250</u>	<u>250</u>	<u>250</u>	<u>250</u>	<u>250</u>
Sub total(C)	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>	<u>500</u>
Total cost (A + B + C)	<u>1,900</u>	<u>3,300</u>	<u>3,900</u>	<u>5,300</u>	<u>5,900</u>

(b) Cost per student 63.33 55.00 43.33 44.17 39.33

(c) Break-even level

Collection per students	=	Rs. 45
Less Variable Cost		<u>20</u>
Contribution		<u>25</u>

Since semi-fixed costs relate to a block of 50 students, the fixed and semi-variable cost for three level will be:

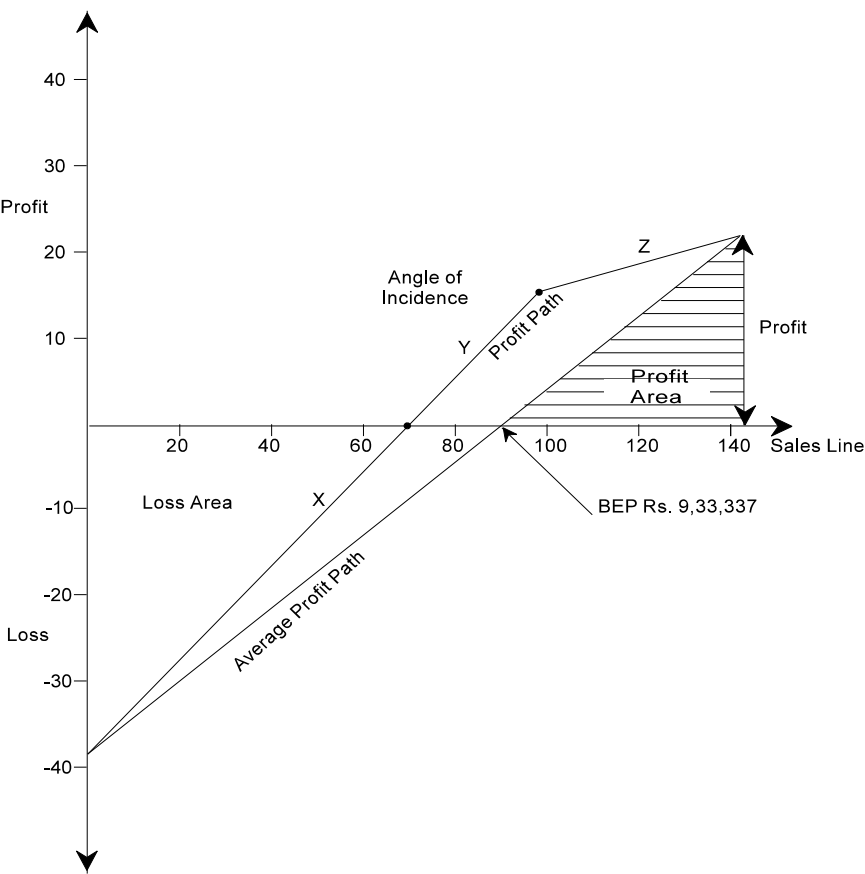
Level of Student	Upto 50	51–100	101–150
Fixed + Semi – variable cost	Rs. 1,300	2,100	2,900
Contribution per unit	25	25	25
B.E. level of students	52	84	116

17.

Product	Sales	Variable cost	Contribution	Cumulative contribution	Fixed Cost	Cumulative profit/loss	(Rs. '0,000) Cumulative sales
X	70	35	35	35	40	–5	70
Y	40	30	10	60	40	20	140
Z	30	15	15	50	40	10	100

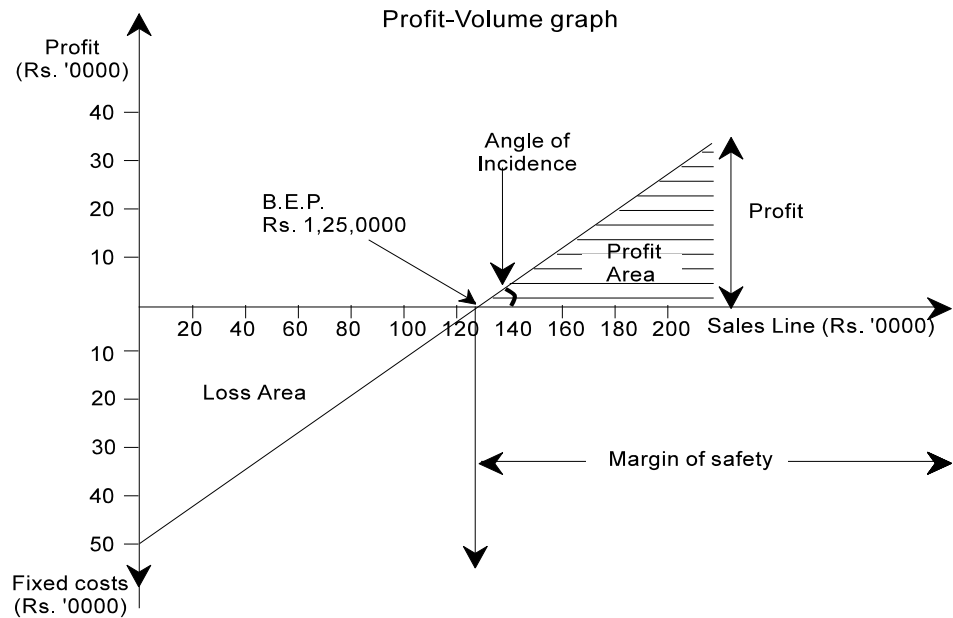
$$P / V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Rs. 6,00,000}}{\text{Rs. 14,00,000}} \times 100 = 42.86\%.$$

$$\text{Break - even Point} = \frac{\text{Fixed cost}}{P / V \text{ Ratio}} = \frac{\text{Rs. 4,00,000}}{0.42857} = \text{Rs. 9,33,337}.$$



Multi -Product Profit-Volume Chart

18.



Profit - Volume Graph

$$P / V \text{ Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{\text{Rs. 8,00,000}}{\text{Rs. 20,00,000}} \times 100 = 40\%.$$

$$\text{Break - even Point} = \frac{\text{Fixed cost}}{P / V \text{ Ratio}} = \frac{\text{Rs. 5,00,000}}{40\%} = \text{Rs. 12,50,000}.$$

$$\text{Margin of Safety} = \text{Actual sales} - \text{B.E. Sales} = 20,00,000 - 12,50,000 = \text{Rs. 7,50,000}.$$

19. (a) **Meaning of Operating Costing:** It is a method of ascertaining costs of providing or operating a service. This method of costing is applied by those undertakings which provide services rather than production of commodities. The emphasis under operating costing is on the ascertainment of cost of services rather than on the cost of manufacturing a product. This costing method is usually made use of by transport companies, gas and water works departments, electricity supply companies, canteens, hospitals, theatres, schools etc.

For computing the operating cost, it is necessary to decide first, about the unit for which the cost is to be computed, this may often require the study of some technical and operating data, for finding out the factors which have a bearing on cost. The cost units usually used in the following service undertakings are as below:

Transport service	– Passenger km., quintal km., or tonne km.
Supply service	– Kw hr., Cubic metre, per kg., per litre.
Hospital	– Patient per day, room per day or per bed, per operation etc.
Canteen	– Per item, per meal etc.
Cinema	– Per ticket.

Composite units i.e. tonnes kms., quintal kms. etc. may be computed in two ways.

- (i) Absolute (weighted average) tonnes-kms., quintal kms. etc.
- (ii) Commercial (simple average) tonnes-kms., quintal kms. etc.
 - (i) Absolute (weighted average) tonnes-kms: Absolute tonnes-kms., are the sum total of tonnes-kms., arrived at by multiplying various distances by respective load quantities carried.
 - (ii) Commercial (simple average) tonnes-kms: Commercial tonnes-kms., are arrived at by multiplying total distance kms., by average load quantity.
- (b) **Job Costing and batch costing:** According to job costing, costs are collected and accumulated according to jobs. Each job or unit of production is treated as a separate entity for the purpose of costing. Job costing may be employed when jobs are executed for different customers according to their specifications.

Batch costing is a form of job costing, a lot of similar units which comprises the batch may be used as a cost unit for ascertaining job. Such a method of costing is used in case of pharmaceutical industry readymade garments, industries manufacturing parts of TV, radio sets etc.

20. (a) **Joint Products:** Joint products represent “two or more products separated in the course of the same processing operation usually requiring further processing, each product being in such proportion that no single product can be designated as a major product”. In other words, two or more products of equal importance, produced, simultaneously from the same process, are known as joint products. For example, in the oil industry, gasoline, fuel oil, lubricants, paraffin, coal tar, asphalt and kerosene are all produced from crude petroleum. These are known as joint products.

By-Products: These are defined as “products recovered from material discarded in a main process, or from the production of some major products, where the material value is to be

considered at the time of severance from the main product.” Thus by-products emerges as a result of processing operation of another product or they are produced from the scrap or waste of materials of a process. In short a by-product is a secondary or subsidiary product which emanates as a result of manufacture of the main product. Examples of by-products are molasses in the manufacture of sugar, tar, ammonia and benzole obtained on carbonisation of coal and glycerine obtained in the manufacture of soap.

- (b) Distinction between Joint-Product and By-Product: The main points of distinction as apparent from the definitions of Joint Products and By-Products are :
 - (i) Joint products are of equal importance whereas by-products are of small economic value.
 - (ii) Joint products are produced simultaneously but the by-products are produced incidentally in addition to the main products
- 21. (a) Differential cost: It may be defined as “the increase or decrease in total cost or the change in specific elements of cost that result from any variation in operations”. It represents an increase or decrease in total cost resulting out of:
 - (a) Producing or distributing a few more or few less of the products;
 - (b) A change in the method of production or of distribution;
 - (c) An addition or deletion of a product or a territory; and
 - (d) Selection of an additional sales channel.

Differential cost, thus includes fixed and semi-variable expenses. It is the difference between the total costs of two alternatives. It is an adhoc cost determined for the purpose of choosing between competing alternatives, each with its own combination of income and costs.

Incremental cost: It is defined as, “the additional costs of a change in the level or nature of activity”. As such for all practical purposes there is no difference between incremental cost and differential cost. However, from a conceptual point of view, differential cost refers to both incremental as well as decremental cost. Incremental cost and differential cost calculated from the same data will be the same. In practice, therefore, generally no distinction is made between differential cost and incremental cost. One aspect which is worthy to note is that incremental cost is not the same at all levels. Incremental cost between 50% and 60% level of output may be different from that which is arrived at between 80% and 90% level of output. Differential cost or incremental cost analysis deals with both short-term and long-term problems. This analysis is more useful when various alternatives or various capacity levels are being considered. Differential costs or incremental costs can be easily identified by preparing a flexible budget as shown below:

- (b) Limitation/Criticism of Standard Costing: The following is some of the criticism which may be levelled against the standard costing system. The arguments have been suitably answered as stated against each by advocates of the standard costing and hence they do not invalidate the usefulness of the system to business enterprises.
 - (i) Variation in price: One of the chief problem faced in the operation of the standard costing system is the precise estimation of likely prices or rate to be paid. The variability of prices is so great that even actual prices are not necessarily adequately representative of cost. But the use of sophisticated forecasting techniques should be able to cover the price fluctuation to some extent. Besides this, the system provides for isolating uncontrollable variances arising from variations to be dealt with separately.
 - (ii) Varying levels of output: If the standard level of output set for pre-determination of standard costs is not achieved, the standard costs are said to be not realised. However, the statement that the capacity utilisation cannot be precisely estimated for absorption of overheads may be true only in some industries of jobbing type. In vast majority of industries, use of forecasting techniques, market research, etc., help to estimate the

output with reasonable accuracy and thus the variation is unlikely to be very large. Prime cost will not be affected by such variation and, moreover, variance analysis helps to measure the effects of idle time.

- (iii) Changing standard of technology: In case of industries that have frequent technological changes affecting the conditions of production, standard costing may not be suitable. This criticism does not affect the system of standard costing. Cost reduction and cost control is a cardinal feature of standard costing because standards once set do not always remain stable. They have to be revised.
- (iv) Attitude of technical people: Technical people are accustomed to think of standards as physical standards and, therefore, they will be misled by standard costs. Since technical people can be educated to adopt themselves to the system through orientation courses, it is not an insurmountable difficulty.
- (v) Mix of products: Standard costing presupposes a pre-determined combination of products both in variety and quantity. The mixture of materials used to manufacture the products may vary in the long run but since standard costs are set normally for a short period, such changes can be taken care of by revision of standards.
- (vi) Standards may be either too strict or too liberal because they may be based on (a) theoretical maximum efficiency, (b) attainable good performance or (c) average past performance. To overcome this difficulty the management should give thought to the selection of a suitable type of standard. The type of standard most effective in the control of costs is one which represents an attainable level of good performance.
- (vii) Standard costs cannot possibly reflect the true value in exchange. If previous historical costs are amended roughly to arrive at estimates for ad hoc purposes, they are not standard costs in the strict sense of the term and hence they cannot also reflect true value in exchange. In arriving at standard costs, however, the economic and technical factors, internal and external, are brought together and analysed to arrive at quantities and prices which reflect optimum operations. The resulting costs, therefore, become realistic measures of the sacrifices involved.

PART II : FINANCIAL MANAGEMENT

1. Answer the following, supporting the same with reasoning/working notes:
 - (a) ABC Company has in issue 5,00,000 Rs. 1 ordinary shares whose current ex-dividend market price is Rs. 1.50 per share. The company has just paid a dividend of 27paise per share, and dividends are expected to continue at this level for some time. If the company has no debt capital, what is the weighted average cost of capital?
 - (b) Five years ago, XYZ Company issued 12 per cent irredeemable debentures at Rs. 103, a Rs. 3 premium to their par value of Rs. 100. The current market price of these debentures is Rs. 94. If the company pays tax at a rate of 35 per cent, what is its current cost of debenture capital?
 - (c) Which of the following statements concerning capital structure is incorrect?
 - (i) Bankruptcy risk is ignored in Miller and Modigliani's first model.
 - (ii) Debt holders are not subject to the effects of financial risk.
 - (iii) The traditional approach assumes that capital markets are perfect.
 - (iv) Miller and Modigliani's second paper takes into account the effects of corporate taxation.
 - (v) Miller and Modigliani's first model argues that no optimal capital structure exists and supports this proposition with arbitrage theory.
 - (d) If a company finds that its cost of capital has changed does this affect the profitability of the company?
 - (e) Thermal Departmental Stores has sales of Rs. 60,00,000, an asset turnover ratio of 6 for the year, and net profits of Rs. 1,20,000.
 - (i) What is the company's return on assets or earning power?
 - (ii) The company is planning to install new point-of-sales cash registers throughout its stores. This equipment is expected to increase efficiency in inventory control, reduce clerical errors, and improve record keeping throughout the system. The new equipment will increase the investment in assets by 20 per cent and is expected to increase the net profit margin from 2 per cent to 3 per cent. No change in sales is expected. What is the effect of the new equipment on the return on assets ratio or earning power?
 - (f) Is it worth offering discounts to debtors to encourage prompt payment?
 - (g) Suggest ways in which companies can exercise control over their levels of working capital.
 - (h) Best of Luck Company had earnings per share of Rs. 4 last year, and it paid a Rs. 2 dividend. Total retained earnings increased by Rs. 1.2 crores during the year, while book value per share at year-end was Rs. 40. The company has no preference shares, and no new equity shares were issued during the year. If the company's year-end debt (which equals its total liabilities) was Rs. 12 crores, what was the company's year-end debt/assets ratio?
2. The expected cash flows of three projects are given below. The cost of capital is 10 per cent.
 - (a) Calculate the payback period, net present value, internal rate of return and accounting rate of return of each project.
 - (b) Show the rankings of the projects by each of the four methods.

Period	Project A	Project B	Project C
	(Rs.)	(Rs.)	(Rs.)
0	(5000)	(5000)	(5000)
1	900	700	2000

2	900	800	2000
3	900	900	2000
4	900	1000	1000
5	900	1100	
6	900	1200	
7	900	1300	
8	900	1400	
9	900	1500	
10	900	1600	

3. Nadar Electronics, which pays tax at 33 per cent, has the following capital structure:

Ordinary shares: 10, 00,000 ordinary shares of nominal value 25 paise per share. The market value of the shares is 49 paise per share. A dividend of 7 paise per share has just been paid, and dividends are expected to grow by eight per cent per year for the foreseeable future.

Preference shares: 2,50,000 preference shares of nominal value 50 paise per share. The market value of the share is 32 paise per share and the annual net dividend of 7.5 per cent has just been paid.

Debentures: Rs. 1,00,000 of irredeemable debentures with a market price of Rs. 92 per Rs. 100 block. These debentures have a coupon rate of 10 per cent and the annual interest payment has just been made.

Calculate the weighted average after-tax cost of capital of Nadar Electronics.

4. Shiv Limited is considering buying a new machine which would have a useful economic life of five years, a cost of Rs. 1,25,000 and a scrap value of Rs. 30,000, with 80 per cent of the cost being payable at the start of the project and 20 per cent at the end of the first year. The machine would produce 50,000 units per annum of a new project with an estimated selling price of Rs. 3 per unit. Direct costs would be Rs. 1.75 per unit and annual fixed costs, including depreciation calculated on a straight-line basis, would be Rs. 40,000 per annum.

In the first year and the second year, special sales promotion expenditure, not included in the above costs, would be incurred, amounting to Rs. 10,000 and Rs. 15,000 respectively.

Evaluate the project using the NPV method of investment appraisal, assuming the company's cost of capital to be 10 percent.

5. Using the following information, complete the balance sheet.

Long-term debt to net worth	0.5 to 1
Total asset turnover	2.5 ×
Average collection period*	18 days
Inventory turnover	9 ×
Gross profit margin	10%
Acid-test ratio	1 to 1

*Assume a 360-day year and all sales on credit.

	Rs.		Rs.
Cash	_____	Notes and payables	1,00,000
Accounts receivable	_____	Long-term debt	_____
Inventory	_____	Common stock	1,00,000
Plant and equipment	_____	Retained earnings	1,00,000
Total assets	_____	Total liabilities and equity	_____

6. The net sales of Himalayan Company is Rs. 30 crores. Earnings before interest and tax of the company as a percentage of net sales is 12%. The capital employed comprises Rs. 10 crores of Equity, Rs. 2 crores of 13% Cumulative Preference Share Capital and 15% Debentures of Rs. 6 crores. Income-tax rate is 40%.
- Calculate the Return-on-equity for the company and indicate its segments due to the presence of Preference Share Capital and Borrowing (Debentures).
 - Calculate the Operating Leverage of the Company given that combined leverage is 3.
7. Given below are the summarized balance sheets of Hello Coolers Limited, as on 31st March, 2006 and 2007.

		(Rs.)
	2006	2007
Liabilities		
Share capital	2,00,000	2,50,000
General Reserve	50,000	60,000
Profit and Loss A/c	30,500	30,600
Bank Loan (Long Term)	70,000	-
Sundry Creditors	1,50,000	1,35,200
Provision for taxation	<u>30,000</u>	<u>35,000</u>
	<u>5,30,000</u>	<u>5,10,800</u>
		(Rs.)
	2006	2007
Assets		
Land and Buildings	2,00,000	1,90,000
Machinery	1,50,000	1,69,000
Stock	1,00,000	74,000
Sundry Debtors	80,000	64,200
Cash	500	800
Bank	-	7,800
Goodwill	<u>-</u>	<u>5,000</u>
	<u>5,30,500</u>	<u>5,10,800</u>

Additional Information:

During the year ended 31st March, 2007

- Dividend of Rs. 23,000 was paid.
- Assets of another company were purchased for a consideration of Rs. 50,000 payable in shares.
The following assets were purchased:
Stock: Rs. 20,000; Machinery Rs. 25,000
- Machinery was further purchased for Rs. 8,000
- Depreciation written off on machinery Rs. 12,000; and
- Income-tax provided during the year Rs. 33,000; loss on sale of machinery Rs. 200 was written off to general reserve.

You are required to prepare the Statement of Cash flow.

8. Assume that it is now January 1, 2007 and Shyam needs Rs. 1,000 on January 1, 2011. His bank compounds interest at an 8 per cent annual rate.
 - (a) How much must he deposit on January 1, 2008, to have a balance of Rs. 1,000 on January 1, 2011?
 - (b) If he wants to make equal payments on each January 1 from 2008 through 2011 to accumulate the Rs. 1,000 how large must each of the 4 payments be?
 - (c) If his friend were to offer either to make the payments calculated in part (b) (Rs. 221.92) or to give him a lump sum of Rs. 750 on January 1, 2008, which would he choose?
 - (d) If he had only Rs. 750 on January 1, 2008, what interest rate, compounded annually, would he have to earn to have the necessary Rs. 1,000 on January 1, 2011?
 - (e) Suppose he can deposit only Rs. 186.29 each from January 1, 2008 through 2011 but he still needs Rs. 1,000 on January 1, 2011. What interest rate, with annual compounding, must he seek out to achieve his goal?
 - (f) To help Shyam reach Rs. 1,000 goal, his father offers to give him Rs. 400 on January 1, 2008. He will get a part-time job and make 6 additional payments of equal amount each 6 months thereafter. If all of this money is deposited in a bank that pays 8 per cent, compounded semiannually, how large must each of the 6 payments be?
 - (g) What is the effective annual rate being paid by the bank in part (f)?
9. Bank of Delhi pays 8 per cent interest, compounded quarterly, on its money market account. The managers of Bank of Gurgaon want its money market account to equal Bank of Delhi's effective annual rate, but interest is to be compounded on monthly basis. What nominal, or quoted, or APR rate must Bank of Gurgaon set?
10. Shivam Company issued a new series of bonds on January 1, 1979. The bonds were sold at par (Rs. 1,000) have a 12 per cent coupon, and mature in 30 years, on December 31, 2008. Coupon payments are made semiannually (on June 30 and December 31).
 - (a) What was the yield to maturity, YTM, of Shivam Company's bonds on January 1, 1979?
 - (b) What was the price of the bond on January 1, 1984, 5 years later, assuming that the level of interest rates had fallen to 10 per cent?
 - (c) Find the current yield and capital gains yield on the bond on January 1, 1984, given the price as determined in part (b).
 - (d) On July 1, 2002, Shivam Company's bonds sold for Rs. 916.42. What was the YTM at that date?
 - (e) What were the current yield and capital gains yield on July 1, 2002?
 - (f) Now, assume that you purchased an outstanding bond on March 1, 2002, when the going rate of interest was 15.5 per cent. How large a cheque must you have written to complete the transaction?
11. Securetel Company presently gives terms of net 30 days. It has Rs. 6 crores in sales, and its average collection period is 45 days. To stimulate demand, the company may give terms of net 60 days. If it does instigate these terms, sales are expected to increase by 15 per cent. After the change, the average collection period is expected to be 75 days, with no difference in payment habits between old and new customers. Variable costs are Rs. 0.80 for every Re. 1.00 of sales, and the company's required rate of return on investment in receivables is 20 per cent. Should the company extend its credit period? (Assume a 360 days year).

12. Given below are the balance sheets of Nomarc Company for the years ending 31st July, 2006 and 31st July, 2007.

Balance Sheet for the year ending on 31st July

	(Rs.) 2006	(Rs.) 2007
Capital and Liabilities		
Share capital	3,00,000	3,50,000
General reserve	1,00,000	1,25,000
Capital reserve (profit on sale of investment)	-	5,000
Profit and loss account	50,000	1,00,000
15% Debentures	1,50,000	1,00,000
Accrued expenses	5,000	6,000
Creditors	80,000	1,25,000
Provision for dividend	15,000	17,000
Provision for taxation	<u>35,000</u>	<u>38,000</u>
Total	<u>7,35,000</u>	<u>8,66,000</u>
Assets		
Fixed Assets	5,00,000	6,00,000
Less: Accumulated depreciation	1,00,000	1,25,000
Net fixed assets	4,00,000	4,75,000
Long-term investments (at cost)	90,000	90,000
Stock (at cost)	1,00,000	1,35,000
Debtors (net of provisions for doubtful debts of Rs. 20,000 and Rs. 25,000 respectively for 2006 and 2007)	1,12,500	1,22,500
Bills receivables	20,000	32,500
Prepaid expenses	5,000	6,000
Miscellaneous expenditure	<u>7,500</u>	<u>5,000</u>
Total	<u>7,35,000</u>	<u>8,66,000</u>

Additional Information:

- (i) During the year 2007, fixed asset with a net book value of Rs. 5,000 (accumulated depreciation Rs. 15,000) was sold for Rs. 4,000.
- (ii) During the year 2007, investments costing Rs. 40,000 were sold, and also investments costing Rs. 40,000 were purchased.
- (iii) Debentures were retired at a premium of 10 percent.
- (iv) Tax of Rs. 27,500 was paid for 2006.
- (v) During 2007, bad debts of Rs. 7,000 were written off against the provision for doubtful debt account.
- (vi) The proposed dividend for 2006 was paid in 2007.

You are required to prepare a funds flow statement (i.e. statement of changes in financial position on working capital basis) for the year ended 31st July, 2007.

- 13 (a) Mercury Limited is setting up a project with a capital outlay of Rs. 60,00,000. It has two alternatives in financing the project cost.

Alternative (I):

100% equity finance

Alternative (II):

Debt-equity ratio 2:1

The rate of interest payable on the debts is 18% p.a. The corporate tax rate is 40%.

Calculate the indifference point between the two alternative methods of financing.

- (b) Venus Limited is a large company with several thousand shareholders. An investor buys 100 shares of the company at the beginning of the year at a market price of Rs. 225. The par value of each share is Rs. 10. During the year, the company pays a dividend at 25 percent. The price of the share at the end of the year is Rs. 267.50. Calculate the total return on the investment.

Suppose the investor sells the shares at the end of the year, what would be the cash inflows at the end of the year?

14. Differentiate between the following:
- (a) Inflation Bonds and Floating Rate Bonds
 - (b) Global Depository Receipts and Euro Convertible Bonds
 - (c) Deep Discount Bonds and Zero Coupon Bonds
 - (d) Debt Securitisation and Bridge Finance.
15. Write short notes on the following:
- (a) Traditional View of Capital Structure
 - (b) Miller Orr Cash Management Model
 - (c) Major Considerations in Capital Structure Planning
 - (d) Relevance of Time Value of Money in Financial Decisions.

SUGGESTED ANSWERS/HINTS

- 1 (a) Market value of equity, $E = 5,00,000 \times 1.50 = \text{Rs. } 7,50,000$
 Market value of debt, $D = \text{nil}$
 Cost of equity capital, $K_e = \text{dividend} / \text{market value of share} = 27/150 = 0.18$
 Since there is no debt capital, $\text{WACC} = K_e = 18 \text{ per cent.}$
- (b) $K_d = 12/94 = 12.8 \text{ per cent}$
 $K_d (\text{after tax}) = 12.8 \times (1 - 0.35) = 8.3 \text{ per cent.}$
- (c) The correct answer is (iii). The traditional approach does not assume perfect markets and therefore recognises the existence of bankruptcy risk. This is reflected in the upward slope of the cost of debt curve and the steepening of the cost of equity curve at high levels of gearing.
- (d) The answer depends on how the company has been financed.
 If the company is financed mainly from short-term sources, it cannot ignore an increase in interest rates and may choose to switch to long-term financing. This will be at a higher rate and profitability will be diminished.
 If the company is financed mainly from long-term sources, an increase in interest rates will not affect its profits directly. However, higher interest rates may depress economic activity and its profits may fall accordingly.
 If the company is financed mainly from retained earnings or equity, an increase in the required return of shareholders will lead to pressure for higher dividends. The company may have insufficient funds to meet such demands.
- (e) (i) $\text{Total assets} = \frac{\text{Sales}}{\text{turnover}} = \frac{\text{Rs. } 60,00,000}{6} = \text{Rs. } 10,00,000$

$$\text{Earning power} = \frac{\text{Net profits}}{\text{Total assets}} = \frac{\text{Rs.1,20,000}}{\text{Rs.10,00,000}} = 12\%$$

$$(ii) \text{ Total assets} = \text{Rs. 10,00,000} \times 1.2 = \text{Rs. 12,00,000}$$

$$\text{Earning power} = \text{Turnover} \times \text{Net profit margin}$$

$$= \frac{\text{Rs. 60,00,000}}{\text{Rs.12,00,000}} \times 3\% = 15\%$$

- (f) Proposed changes to credit policy should be evaluated in the light of the additional costs and benefits that will result from their being undertaken. For example, the cost of the introduction of cash discounts can be compared with the benefits of faster settlement of accounts in terms of reduced interest charges, and possibly also the additional business that may result. The change should only be undertaken if the marginal benefits arising from the new policy exceed its marginal costs.
- (g) Companies can exercise control over the levels of their working capital by formulating and implementing policies concerning inventory, debtors, cash and creditors. Such policies will take account of the factors that influence these components of working capital, as follows:
- ◆ Debtors: Credit period allowed by a company and its competitors, speed of invoicing and other aspects of administrative efficiency, the use of discounts for early settlement, debtor collection methods, the forecast volume of sales.
 - ◆ Stock: The length of the production process, the rate of turnover of raw materials, the turnover period of finished goods, delivery lead time, the budgeted and actual volumes of output and sales.
 - ◆ Creditors: The extent to which a company can delay payments to suppliers, the volume of purchases, and the availability of cash discounts for early payment.
 - ◆ Cash: Interest rates and available short-term investments, the availability of credit, the ease with which a company can access funds.
- (h) Best of Luck Company paid Rs. 2 in dividends and retained Rs. 2 per share. Since total retained earnings rose by Rs. 1.2 crores, there must be 60 lakhs shares outstanding. With a book value of Rs. 40 per share, total equity shares must be Rs. 40 (60 lakhs) = Rs. 24 crores. Since the Company has Rs. 12 crores of debt, its debt ratio must be 33.3 per cent:

$$\frac{\text{Debt}}{\text{Assets}} = \frac{\text{Debt}}{\text{Debt} + \text{Equity}} = \frac{\text{Rs.12 crores}}{\text{Rs.12 crores} + \text{Rs. 24 crores}}$$

$$= 0.333 = 33.3\%.$$

2. (a) Payback Period Method

$$A = 5 + (500/900) = 5.5 \text{ years}$$

$$B = 5 + (500/1200) = 5.4 \text{ years}$$

$$C = 2 + (1000/2000) = 2.5 \text{ years}$$

Net Present Value Method

$$\text{NPV}_A = (-5000) + (900 \times 6.145) = (5000) + 5530.5 = \text{Rs. 530.5}$$

NPV_B is calculated as follows:

Year	Cash flow (Rs.)	10% discount factor	Present value (Rs.)
0	(5000)	1.000	(5,000)
1	700	0.909	636

2	800	0.826	661
3	900	0.751	676
4	1000	0.683	683
5	1100	0.621	683
6	1200	0.564	677
7	1300	0.513	667
8	1400	0.467	654
9	1500	0.424	636
10	1600	0.386	618
			1591

$$NPV_C = (-5000) + (2000 \times 2.487) + (1000 \times 0.683) = \text{Rs. } 657$$

Internal Rate of Return Method

If $NPV_A = 0$, present value factor of IRR over 10 years = $5000/900 = 5.556$

From tables, IRR = 12 per cent.

IRR_B

Year	Cash flow (Rs.)	10% discount factor	Present value (Rs.)	20% discount factor	Present value (Rs.)
0	(5,000)	1.000	(5,000)	1.000	(5,000)
1	700	0.909	636	0.833	583
2	800	0.826	661	0.694	555
3	900	0.751	676	0.579	521
4	1,000	0.683	683	0.482	482
5	1,100	0.621	683	0.402	442
6	1,200	0.564	677	0.335	402
7	1,300	0.513	667	0.279	363
8	1,400	0.467	654	0.233	326
9	1,500	0.424	636	0.194	291
10	1,600	0.386	<u>618</u>	0.162	<u>259</u>
			<u>1,591</u>		<u>(776)</u>

$$\text{Interpolating : } IRR_B = 10 + \frac{1,591 \times 10}{(1,591 + 776)} = 10 + 6.72 = 16.72 \text{ per cent}$$

IRR_C

Year	Cash flow (Rs.)	15% discount factor	Present value (Rs.)	18% discount factor	Present value (Rs.)
0	(5,000)	1.000	(5,000)	1.000	(5,000)
1	2,000	0.870	1,740	0.847	1,694
2	2,000	0.756	1,512	0.718	1,436
3	2,000	0.658	1,316	0.609	1,218
4	1,000	0.572	<u>572</u>	0.516	<u>516</u>
			<u>140</u>		<u>(136)</u>

$$\text{Interpolating : } IRR_C = 15 + \frac{140 \times 3}{(140 + 136)} = 15 + 1.52 = 16.52 \text{ per cent}$$

Accounting Rate of Return Method

ARR_A

$$\text{Average capital employed} = \frac{5,000}{2} = \text{Rs. } 2,500$$

$$\text{Average accounting profit} = \frac{(9,000 - 5,000)}{10} = \text{Rs. } 400$$

$$ARR_A = \frac{(400 \times 100)}{2,500} = 16 \text{ per cent}$$

ARR_B

$$\text{Average accounting profit} = \frac{(11,500 - 5,000)}{10} = \text{Rs. } 650$$

$$ARR_B = \frac{(650 \times 100)}{2,500} = 26 \text{ per cent}$$

ARR_C

$$\text{Average accounting profit} = \frac{(7,000 - 5,000)}{4} = \text{Rs. } 500$$

$$ARR_C = \frac{(500 \times 100)}{2,500} = 20 \text{ per cent}$$

Summary of Results

Project	A	B	C
Payback (years)	5.5	5.4	2.5
ARR (%)	16	26	20
IRR (%)	12.4	16.7	16.5
NPV (Rs.)	530.5	1,591	657

(b)

Comparison of Rankings

Method	Payback	ARR	IRR	NPV
1	C	B	B	B
2	B	C	C	C
3	A	A	A	A

3. $K_e = (7 \times (1 + 0.08) / 49) + 0.08 = 0.1543 + 0.08 = 0.2343 = 23 \text{ per cent}$

$$K_p = D_p / P_0 = (0.075 \times 50) / 32 = 0.1172 = 12 \text{ per cent}$$

$$K_d = I / P_0 = (0.1 \times 100) / 92 = 0.1087 = 11 \text{ per cent}$$

A market-based weighting is preferred to one based on book values.

4. Calculation of Net Cash flows

$$\text{Contribution} = (3.00 - 1.75) \times 50,000 = \text{Rs. } 62,500$$

$$\text{Fixed costs} = 40,000 - (1,25,000 - 30,000) / 5 = \text{Rs. } 21,000$$

Year	Capital (Rs.)	Contribution (Rs.)	Fixed costs (Rs.)	Adverts (Rs.)	Net cash flow (Rs.)
0	(1,00,000)				(1,00,000)
1	(25,000)	62,500	(21,000)	(10,000)	6,500
2		62,500	(21,000)	(15,000)	26,500
3		62,500	(21,000)		41,500
4		62,500	(21,000)		41,500
5	30,000	62,500	(21,000)		71,500

Calculation of Net Present Value

Year	Net cash flow (Rs.)	10% discount factor	Present value (Rs.)
0	(1,00,000)	1.000	(1,00,000)
1	6,500	0.909	5,909
2	26,500	0.826	21,889
3	41,500	0.751	31,167
4	41,500	0.683	28,345
5	71,500	0.621	44,402
			31,712

The net present value of the project is Rs. 31,712.

$$5. \quad \frac{\text{Long-term debt}}{\text{Net worth}} = .5 = \frac{\text{Long-term debt}}{2,00,000}$$

Long-term debt = Rs. 1,00,000

Total liabilities and net worth = Rs. 4,00,000

Total assets = Rs. 4,00,000

$$\frac{\text{Sales}}{\text{Total assets}} = 2.5 = \frac{\text{Sales}}{4,00,000}$$

Sales = Rs. 10,00,000

Cost of goods sold = (.9) (Rs. 10,00,000) = Rs. 9,00,000.

$$\frac{\text{Cost of goods sold}}{\text{Inventory}} = \frac{9,00,000}{\text{Inventory}} = 9$$

Inventory = Rs. 1,00,000

$$\frac{\text{Receivables} \times 360}{10,00,000} = 18 \text{ days}$$

Receivables = Rs. 50,000

$$\frac{\text{Cash} + 50,000}{1,00,000} = 1$$

Cash = Rs. 50,000

Plant and equipment = Rs. 2,00,000.

Balance Sheet

	Rs.		Rs.
Cash	50,000	Notes and payables	1,00,000
Accounts receivable	50,000	Long-term debt	1,00,000
Inventory	1,00,000	Common stock	1,00,000
Plant and equipment	<u>2,00,000</u>	Retained earnings	<u>1,00,000</u>
Total assets	<u>4,00,000</u>	Total liabilities and equity	<u>4,00,000</u>

6. (i) Net Sales : Rs. 30 crores

EBIT Rs. 3.6 crores @ 12% on sales

$$ROI = \frac{EBIT}{\text{Capital Employed}} = \frac{3.6}{10 + 2 + 6} \times 100 = 20\%$$

	Rs. in crores
EBIT	3.6
Interest on Debt	<u>0.9</u>
EBT	2.7
Less : Tax @ 40%	<u>1.08</u>
EAT	1.62
Less : Preference dividend	<u>0.26</u>
Earnings available for Equity Shareholders	<u>1.36</u>
Return on Equity = $1.36/10 \times 100 = 13.6\%$	

Segments due to the presence of Preference Share Capital and Borrowing (Debentures)

Segment of ROE due to Preference Capital: $[0.20(1 - 0.4) - 0.13] \times 0.2 = -0.002$

Segment of ROE due to Debentures: $[0.20(1 - 0.4) - 0.15(1 - 0.4)] \times 0.6 = 0.018$

Or, $-0.2\% + 1.8\% = 1.6\%$

Computation of Weighted Average Cost of Capital

	Source	Proportion	Cost (%)	WACC(%)
(i)	Equity	10/18	13.60	7.56
(ii)	Preference shares	2/18	13.00	1.44
(iii)	Debt	6/18	9.00	<u>3.00</u>
			Total	<u>12.00</u>

- (ii) Degree of Operating Leverage

$$\begin{aligned} \text{Degree of Financial Leverage} &= \frac{EBIT}{EBIT - \text{Interest} - \text{Preference dividend}} \\ &= \frac{3.6}{3.6 - 0.9 - 0.26} = 1.4757 \end{aligned}$$

$$\begin{aligned}
 \text{Degree of Combined Leverage} &= \text{DFL} \times \text{DOL} \\
 3 &= 1.4754 \times \text{DOL} \\
 \therefore \text{DOL} &= \frac{3}{1.4754} \\
 \text{Degree of Operating Leverage} &= 2.033
 \end{aligned}$$

7. Working Notes:

Machinery A/c			
To balance b/d	1,50,000	By Loss on sale of machine	200
To Share Capital a/c		By Depreciation	12,000
(Purchase by issue of shares)	25,000		
To Cash	8,000	By Cash (Sale of machine)	1,800
(Purchase of machinery)			
	<u> </u>	By Balance c/f	<u>1,69,000</u>
	1,83,000		1,83,000

Provision for Taxation Account			
To Bank (Tax paid)	28,000	By Balance b/d	30,000
		By Profit & Loss a/c	33,000
To Balance c/d	<u>35,000</u>	(Tax provision)	<u> </u>
	63,000		63,000

Calculation of Profit made during the year			(Rs.)
Balance as at 31-3-2007			30,600
Add: Appropriation made during the year:			
1. Proposed dividend		23,000	
2. Transfer to General Reserve Balance 1-4-2006	60,000		
Less: Closing balance as on 31-3-2007	<u>50,000</u>		
	10,000		
Add: Loss on sale of Machinery	200	10,200	
3. Income Tax		<u>33,000</u>	66,200
Add: Non cash items			
1. Depreciation- Machinery		12,000	
2. Depreciation - Land & Building		<u>10,000</u>	<u>22,000</u>
			1,18,800
Less: Balance as at 1-4-2006			<u>30,500</u>
Profit made during the year from operations			<u>88,300</u>

Calculation of Cash from Operations			(Rs.)
Funds from operations			88,300
Add: Decrease in Current Asset			
Opening stock		1,00,000	
Closing stock	74,000		
Less: Purchase by issue of shares	<u>20,000</u>	<u>54,000</u>	

Decrease in stock	46,000	
Debtors (80,000 - 64,200)	<u>15,800</u>	<u>61,800</u>
		1,50,100
Less: Decrease in current liability - creditors		<u>14,800</u>
Cash from operations		<u>1,35,300</u>

Cash flow Statement of Hello Coolers Limited as on 31 st March, 2007		(Rs.)
Cash in hand and at Bank on 1-4-2006		500
Add: Sources of Cash		
Cash from Operation	1,35,300	
Sale of Machinery	<u>1,800</u>	<u>1,37,100</u>
Total cash available for use		1,37,600
Less: Uses		
Payment of Long term loan	70,000	
Purchase of machinery for cash	8,000	
Payment of dividend	23,000	
Payment of tax	<u>28,000</u>	<u>1,29,000</u>
		<u>8,600</u>

Cash in hand and at Bank as on 31-3-2007 (7,800+800)= Rs. 8,600

8. (a) Shyam's deposit will grow for 3 years at 8 per cent. The fact that it is now January 1, 2007, is irrelevant. The deposit on January 1, 2008, is the present value, PV, and the future value, FV, is Rs. 1,000. Solving for PV:

$$PV = \frac{FV_n}{(1+i)^n} = \frac{\text{Rs. } 1,000}{(1.08)^3} = \text{Rs. } 793.83.$$

- (b) Here, we are dealing with a 4 year annuity whose first payment occurs one year from today, on 1/1/08, and whose future value must equal Rs. 1,000. When $N = 4$, $I = 8$, $PV = 0$, $FV = 1,000$, then $PMT = \text{Rs. } 221.92$. $PMT (FVIFA_{8\%,4}) = FVA_4$

$$PMT \left(\frac{(1+0.08)^4 - 1}{0.08} \right) = \text{Rs. } 1,000$$

$$PMT = \frac{\text{Rs. } 1,000}{4.5061} = \text{Rs. } 221.92 = \text{Payment necessary to accumulate Rs. } 1,000$$

- (c) This problem can be approached in several ways. Perhaps the simplest is to ask this question: "If Shyam received Rs. 750 on 1/1/08 and deposited it to earn 8 per cent, would he have the required Rs. 1,000 on 1/1/11?" The answer is No.

$$FV_3 = \text{Rs. } 750(1.08)(1.08)(1.08) = \text{Rs. } 944.78.$$

This indicates that Shyam should let his father make the payments rather than accept the lump sum of Rs. 750.

He should also compare the Rs. 750 with the PV of the payments as shown:

Using $N = 4$, $I = 8$, $PMT = -221.92$, $FV = 0$, PV can be solved as $PV = \text{Rs. } 735.03$.

$$PMT (PVIFA_{8\%,4}) = PVA_4$$

$$\text{Rs. } 221.92 \left(\frac{1 - \frac{1}{(1+0.08)^4}}{0.08} \right) = \text{PVA}_4$$

Rs. 221.92 (3.3121) = Rs. 735.02 = Present value of the required payments.

This is less than the Rs. 750 lump sum offer, so Shyam's initial reaction might be to accept the lump sum of Rs. 750. However, this would be a mistake. The problem is that when the Rs. 735.03 PV of the annuity is found, it is the value of the annuity today i.e. on January 1, 2007. He is comparing Rs. 735.03 today with the lump sum of Rs. 750 1 year from now. This is, of course, invalid. What he should have done was take the Rs. 735.03, recognize that this is the PV of an annuity as of January 1, 2007, multiply Rs. 735.03 by 1.08 to get Rs. 793.83, and compare Rs. 793.83 with the lump sum of Rs. 750. He should then take his father's offer to make the payments rather than take the lump sum on January 1, 2008.

(d) Using $N = 3$, $PV = -750$, $PMT = 0$, $FV = 1,000$, I can be solved as 10.0642%.

(e) Using $N = 4$, $PV = 0$, $PMT = -186.29$, $FV = 1,000$, I can be solved as 19.9997%.

Shyam might be able to find a borrower willing to offer him a 20 per cent interest rate, but there would be some risk involved – he or she might not actually pay him his Rs. 1,000.

(f) Find the future value of the original Rs. 400 deposit:

$$\text{FV}_6 = \text{PV} (1.04)^6 = \text{Rs. } 400 (1.2653) = \text{Rs. } 506.13.$$

This means that on January 1, 2011, he needs an additional sum of Rs. 493.87:

$$\text{Rs. } 1,000.00 - \text{Rs. } 506.13 = \text{Rs. } 493.87.$$

This will be accumulated by making 6 equal payments that earn 8 per cent compounded semiannually, or 4 per cent each 6 months.

$$\text{PMT} (\text{FVIFA}_{4\%,6}) = \text{FVA}_6$$

$$\text{PMT} \left(\frac{(1+0.04)^6 - 1}{0.04} \right) = \text{Rs. } 493.88$$

$$\text{PMT} = \frac{\text{Rs. } 493.88}{6.6330} = \text{Rs. } 74.46.$$

$$\begin{aligned} \text{(g) Effective annual rate} &= \left(1 + \frac{i_{\text{Nom}}}{m} \right)^m - 1.0 \\ &= \left(1 + \frac{0.08}{2} \right)^2 - 1 = (1.04)^2 - 1 \\ &= 1.0816 - 1 = 0.0816 = 8.16\%. \end{aligned}$$

9. Bank of Delhi's effective annual rate is 8.24 per cent:

$$\begin{aligned} \text{Effective annual rate} &= \left(1 + \frac{0.08}{4} \right)^4 - 1.0 \\ &= (1.02)^4 - 1 = 1.0824 - 1 \\ &= 0.0824 = 8.24\%. \end{aligned}$$

Now, Bank of Gurgaon must have the same effective annual rate:

$$\left(1 + \frac{i}{12}\right)^{12} - 1.0 = 0.0824$$

$$\left(1 + \frac{i}{12}\right)^{12} = 1.0824$$

$$1 + \frac{i}{12} = (1.0824)^{1/12}$$

$$1 + \frac{i}{12} = 1.00662$$

$$\frac{i}{12} = 0.00662$$

$$i = 0.07944 = 7.94\%.$$

Thus, the two banks have different quoted rates – Bank of Delhi's quoted rate is 8%, while Bank of Gurgaon's quoted rate is 7.94%; however, both banks have the same effective annual rate of 8.24%. The difference in their quoted rates is due to the difference in compounding frequency.

10. (a) Shivam Company's bonds were sold at par; therefore, the original YTM equalled the coupon rate of 12 per cent.

$$(b) \quad V_B = \sum_{t=1}^{50} \frac{\text{Rs.}120/2}{\left(1 + \frac{0.10}{2}\right)^t} + \frac{\text{Rs.}1,000}{\left(1 + \frac{0.10}{2}\right)^{50}}$$

Using: $N = 50$, $I = 5$, $PMT = 60$, $FV = 1,000$, and solving for PV , $PV = \text{Rs. } 1,182.56$.

- (c) Current yield = Annual coupon payment/Price
 = Rs. 120/Rs. 1,182.56
 = 0.1015 = 10.15%.

Capital gains yield = Total yield – Current yield
 = 10% – 10.15% = –0.15%.

- (d) Inputting the following values:

$N = 13$, $PV = -916.42$, $PMT = 60$, and $FV = 1,000$. Find the value of $K_d/2 = I = ?$

$K_d/2 = 7.00\%$; therefore, $K_d = 14.00\%$.

- (e) Current yield = Rs. 120/Rs. 916.42 = 13.09%.

Current gains yield = 14% - 13.09% = 0.91%.

- (f) On March 1, 2002, there were $13\frac{3}{4}$ periods left before the bond matured. Bond traders actually use the following procedure to determine the price of the bond:

(i) Find the price of the bond on the next coupon date, July 1, 2002. Using $N = 13$, $I = 7.75$, $PMT = 60$, $FV = 1,000$, and solving for PV , $PV = \text{Rs. } 859.76$.

(ii) Add the coupon, Rs. 60, to the bond price to get the total value, TV , of the bond on the next interest payment date: $TV = \text{Rs. } 859.76 + \text{Rs. } 60.00 = \text{Rs. } 919.76$.

(iii) Discount this total value back to the purchase date (March 1, 2002):

Using $N = 4/6$, $I = 7.75$, $PMT = 0$, $FV = 919.76$, and solving for PV , $PV = \text{Rs. } 875.11$.

- (iv) Therefore, you would have written a cheque for Rs. 875.11 to complete the transaction. Of this amount, Rs. 20 = ($\frac{1}{5}$) (Rs. 60) would represent accrued interest and Rs. 855.11 would represent the bond's basic value. This breakdown would affect both your taxes and those of the seller.

$$11. \text{ Receivable turnover} = \frac{360}{75} = 4.8$$

Profitability of additional sales = Rs. 90,00,000 $\times$.2 = Rs. 18,00,000.

$$\text{Additional receivables associated with the new sales} = \frac{\text{Rs. 90,00,000}}{4.8} = \text{Rs. 18,75,000}$$

$$\begin{aligned} \text{Additional investment in receivables associated with the new sales} \\ = \text{Rs. 18,75,000} \times .8 = \text{Rs. 15,00,000} \end{aligned}$$

$$\text{New level of receivables associated with the original sales} = \frac{\text{Rs. 6,00,00,000}}{4.8} = \text{Rs. 1,25,00,000}$$

$$\text{Old level of receivables associated with the original sales} = \frac{\text{Rs. 6,00,00,000}}{8} = \text{Rs. 75,00,000}$$

Incremental receivable investment, original sales = Rs. 50,00,000.

Total increase in receivable investment = Rs. 15,00,000 + Rs. 50,00,000 = Rs. 65,00,000.

Carrying cost of additional investment = .20 $\times$ Rs. 65,00,000 = Rs. 13,00,000.

Advise: As the incremental carrying cost is less than the incremental profitability, the company should lengthen its credit period from 30 to 60 days.

12. Funds Flow Statement for the year ended 31st July, 2007

(Rs.)

Sources

Working capital from operations	1,71,000	
Sale of fixed asset	4,000	
Sale of investments	45,000	
Share capital issued	<u>50,000</u>	
Total Funds Provided		<u>2,70,000</u>

Uses

Purchase of fixed assets	1,20,000	
Purchase of investments	40,000	
Payment of debentures (at a premium of 10%)	55,000	
Payment of dividend	15,000	
Payment of taxes	<u>27,500</u>	
Total Funds Applied		<u>2,57,500</u>
Increase in Working Capital		12,500

Working Notes:

(a) Funds from Operations:

	Rs.
Profit and loss balance on 31 st July, 2007	1,00,000
Add: Depreciation	40,000
Loss on sale of asset	1,000
Misc. expenditure written off	2,500
Transfer to reserve	25,000
Premium on redemption of debentures	5,000
Provision for dividend	17,000
Provision for taxation	<u>30,500</u>
	2,21,000
Less: Profit and loss balance on 31 st July, 2006	<u>50,000</u>
Funds from Operations	<u>1,71,000</u>

- (b) Depreciation for the year 2007 was Rs. 40,000. The accumulated depreciation on 31st July, 2006 was Rs. 1,00,000 of which Rs. 15,000 was written off during the year on account of sale of asset. Thus, the balance on 31st July, 2007 should have been Rs. 85,000. Since the balance is Rs. 1,25,000, the company would have provided a depreciation of Rs. 40,000 (i.e. Rs. 1,25,000 – Rs. 85,000) during the year 2007.
- (c) Fixed assets were of Rs. 5,00,000 in 2006. With the sale of a fixed asset costing Rs. 20,000 (i.e. Rs. 5,000 + Rs. 15,000) this balance should have been Rs. 4,80,000. But the balance on 31st July, 2007 is Rs. 6,00,000. This means fixed assets of Rs. 1,20,000 were acquired during the year.
- (d) Profit on the sale of investment, Rs. 5,000 has been credited to capital reserve account. It implies that investments were sold for Rs. 45,000 (i.e. Rs. 40,000 + Rs. 5,000).
- (e) The provision for taxation during the year 2007 is Rs. 30,500 [i.e. Rs. 38,000 – (Rs. 35,000 – Rs. 27,500)].
- (f) Bad debts written off against the provision account have no significance for funds flow statement, as they do not affect working capital.

13 (a). Alternatives in Financing and its Financial Charges

- (I) By issue of 6,00,000 equity shares of Rs. 10 each amounting to Rs. 60 lakhs. No financial charges are involved.
- (II) By raising the funds in the following way:

Debt = Rs. 40 lakhs

Equity = Rs. 20 lakhs (2,00,000 equity shares of Rs. 10 each)

$$\text{Interest payable on debt} = 40,00,000 \times \frac{18}{100}$$

$$= \text{Rs. } 7,20,000$$

The difference point between the two alternatives is calculated by:

$$\frac{(\text{EBIT} - I_1)(1 - T)}{E_1} = \frac{(\text{EBIT} - I_2)(1 - T)}{E_2}$$

Where,

EBIT = Earning before interest and taxes

I_1 = Interest charges in Alternative (I)

I_2 = Interest charges in Alternative (II)

T = Tax rate

E_1 = Equity shares in Alternative (I)

E_2 = Equity shares in Alternative (II)

Putting the values, the break-even point would be as follows:

$$\frac{(EBIT - 0)(1 - 0.40)}{6,00,000} = \frac{(EBIT - 7,20,000)(1 - 0.40)}{2,00,000}$$

$$\frac{(EBIT)(0.60)}{6,00,000} = \frac{(EBIT - 7,20,000)(0.60)}{2,00,000}$$

$$\frac{EBIT(0.60)}{3} = \frac{0.60(EBIT - 7,20,000)}{1}$$

$$EBIT = 3EBIT - 21,60,000$$

$$-2 EBIT = -21,60,000$$

$$EBIT = \frac{21,60,000}{2}$$

$$EBIT = 10,80,000$$

Therefore, it can be seen that the EBIT at indifference point explains that the earnings per share for the two alternatives is equal.

$$\begin{aligned} \text{(b) Total investment} &= \text{Market price of share} \times \text{Number of shares} \\ &= \text{Rs. } 225 \times 100 \\ &= \text{Rs. } 22,500 \end{aligned}$$

Since the company pays a dividend at 25 percent.

$$\begin{aligned} \text{Therefore, dividend per share} &= \text{Rs. } 10 \times 25\% \\ &= \text{Rs. } 2.50 \end{aligned}$$

$$\begin{aligned} \text{Total dividend} &= (\text{Dividend rate} \times \text{Par value}) \times \text{Number of shares} \\ &= \text{Dividend per share} \times \text{Number of shares} \end{aligned}$$

$$\begin{aligned} \text{Dividend} &= \text{Rs. } 2.50 \times 100 \\ &= \text{Rs. } 250 \end{aligned}$$

Since the ending share price increased, the investor has made a capital gain:

$$\begin{aligned} \text{Capital gain (loss)} &= (\text{Selling price} - \text{Buying price}) \times \text{Number of shares} \\ &= (\text{Rs. } 267.50 - \text{Rs. } 225) \times 100 \\ &= \text{Rs. } 4,250 \end{aligned}$$

$$\begin{aligned} \text{Total return} &= \text{Dividend} + \text{Capital gain} \\ &= \text{Rs. } 250 + \text{Rs. } 4,250 \\ &= \text{Rs. } 4,500 \end{aligned}$$

If the shares are sold at the end of the year, then the cash inflows would be:

$$\begin{aligned}
 \text{Cash flow at the end of the year} &= \text{Dividends} + \text{Value of shares sold} \\
 &= \text{Rs. } 250 + (\text{Rs. } 267.50 \times 100) \\
 &= \text{Rs. } 250 + 26,750 \\
 &= \text{Rs. } 27,000.
 \end{aligned}$$

It can be seen that the cash flow at the end of the year equals to the initial investment of Rs. 22,500 plus the total return of Rs. 4,500 i.e., Rs. 22,500 + Rs. 4,500 = Rs. 27,000.

14. (a) Inflation Bonds and Floating Rate Bonds

Inflation Bonds are the bonds in which interest rate is adjusted for inflation. Thus, the investor gets interest which is free from the effects of inflation. For example, if the interest rate is 11 per cent and the inflation is 5 per cent, the investor will earn 16 per cent meaning thereby that the investor is protected against inflation.

On the other hand, Floating Rate Bonds, as the name suggests, are the bonds where the interest rate is not fixed and is allowed to float depending upon the market conditions. This is an ideal instrument which can be resorted to by the issuers to hedge themselves against the volatility in the interest rates. This has become more popular as a money market instrument and has been successfully issued by financial institutions like IDBI, ICICI etc.

(b) Global Depository Receipts (GDRs) and Euro Convertible Bonds

Global Depository Receipts are negotiable certificates denominated in US dollars which represent a Non-US company's publicly traded local currency equity shares. GDRs are created when the local currency shares of an Indian company are delivered to Depository's local custodian Bank against which the Depository bank issues depository receipts in US dollars. The GDRs may be traded freely in the overseas market like any other dollar-expressed security either on a foreign stock exchange or in the over-the-counter market or among qualified institutional buyers.

By issue of GDRs Indian companies are able to tap global equity market to raise foreign currency funds by way of equity. It has distinct advantage over debt as there is no repayment of the principal and service costs are lower.

On the other hand, Euro Convertible Bonds are quasi-debt securities (unsecured) which can be converted into depository receipts or local shares. ECBs offer the investor an option to convert the bond into equity at a fixed price after the minimum lock in period. The price of equity shares at the time of conversion will have a premium element. The bonds carry a fixed rate of interest. These are bearer securities and generally the issue of such bonds may carry two options viz. call option and put option. A call option allows the company to force conversion if the market price of the shares exceeds a particular percentage of the conversion price. A put option allows the investors to get his money back before maturity. In the case of ECBs, the payment of interest and the redemption of the bonds will be made by the issuer company in US dollars. ECBs issues are listed at London or Luxembourg stock exchanges.

An issuing company desirous of raising the ECBs is required to obtain prior permission of the Department of Economic Affairs, Ministry of Finance and Government of India. Companies having 3 years of good track record are permitted to raise funds. The condition is not applicable in the case of projects in infrastructure sector.

(c) Deep Discount Bonds and Zero Coupon Bonds

Deep Discount Bonds (DDBs) are in the form of zero interest bonds. These bonds are sold at a discounted value and on maturity face value is paid to the investors. In such bonds, there is no interest payout during lock-in period.

IDBI was first to issue a Deep Discount Bonds (DDBs) in India in January 1992. The bond of a face value of Rs.1 lakh was sold for Rs. 2,700 with a maturity period of 25 years.

On the other hand, a Zero Coupon Bond (ZCB) does not carry any interest but it is sold by the issuing company at a discount. The difference between discounted value and maturing or face value represents the interest to be earned by the investor on such bonds.

(d) Debt Securitisation and Bridge Finance

Debt Securitisation is a method of recycling of funds. It is especially beneficial to financial intermediaries to support the lending volumes. Assets generating steady cash flows are packaged together and against this asset pool, market securities can be issued, e.g. housing finance, auto loans, and credit card receivables.

Process of Debt Securitisation

- (i) The origination function: A borrower seeks a loan from a finance company, bank, HDFC. The credit worthiness of borrower is evaluated and contract is entered into with repayment schedule structured over the life of the loan.
- (ii) The pooling function: Similar loans on receivables are clubbed together to create an underlying pool of assets. The pool is transferred in favour of Special Purpose Vehicle (SPV), which acts as a trustee for investors.
- (iii) The securitisation function: SPV will structure and issue securities on the basis of asset pool. The securities carry a coupon and expected maturity which can be asset-based/mortgage based. These are generally sold to investors through merchant bankers. Investors are – pension funds, mutual funds, insurance funds.

The process of securitisation is without recourse i.e. investor bears the credit risk or risk of default. Credit enhancement facilities like insurance, LOC & guarantees are provided.

Bridge Finance, on the other hand, refers to loans taken by a company normally from commercial banks for a short period, pending disbursement of loans sanctioned by financial institutions. Normally, it takes time for financial institutions to disburse loans to companies. However, once the loans are approved by the term lending institutions, companies, in order not to lose further time in starting their projects, arrange short term loans from commercial banks. Bridge loans are also provided by financial institutions pending the signing of regular term loan agreement, which may be delayed due to non-compliance of conditions stipulated by the institutions while sanctioning the loan.

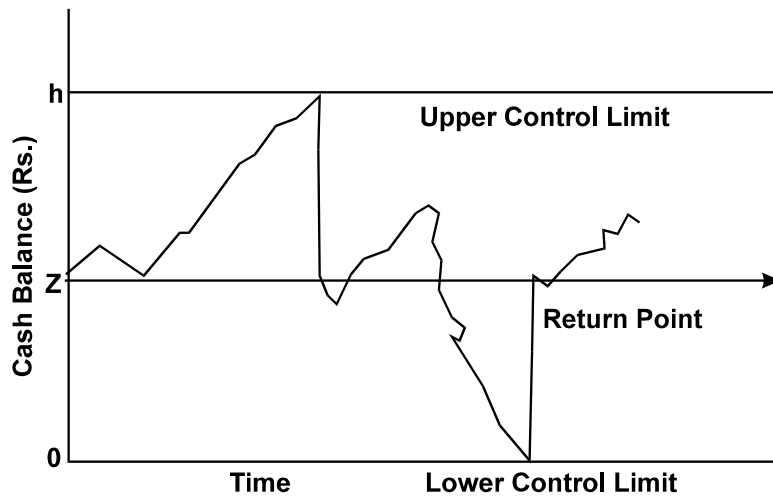
15. (a) Traditional View of Capital Structure

The traditional theory of capital structure proposes that an optimal capital exists, and so under this theory a company can increase its total value by the sensible use of gearing. The traditional theory argues that:

- ◆ K_e rises with increased gearing due to the increasing financial and bankruptcy risk;
- ◆ K_d rises only at high gearing levels when bankruptcy risk increases;
- ◆ Replacing more expensive equity finance with less expensive debt finance decreases the company's WACC, up to a joint; and
- ◆ Once an optimum level of gearing is reached, K_e increases by a rate which more than offsets the effect of using cheaper debt, and so the WACC increases.

(b) Miller Orr Cash Management Model

According to this model the net cash flow is completely stochastic. When changes in cash balance occur randomly, the application of control theory serves a useful purpose. The Miller – Orr model is one of such control limit models. This model is designed to determine the time and size of transfers between an investment account and cash account. In this model control limits are set for cash balances. These limits may consist of 'h' as upper limit, 'z' as the return point and zero as the lower limit.



MILLER-ORR CASH MANAGEMENT MODEL

When the cash balance reaches the upper limit, the transfer of cash equal to 'h – z' is invested in marketable securities account. When it touches the lower limit, a transfer from marketable securities account to cash account is made. During the period when cash balance stays between (h, z) and (z, 0) i.e. high and low limits, no transactions between cash and marketable securities account is made. The high and low limits of cash balance are set up on the basis of fixed cost associated with the securities transaction, the opportunities cost of holding cash and degree of likely fluctuations in cash balances. These limits satisfy the demands for cash at the lowest possible total costs. The formula for calculation of the spread between the control limits is:

$$\text{Spread} = 3 \left(\frac{3/4 \times \text{Transaction Cost} \times \text{Variance of Cashflows}}{\text{Interest rate}} \right)^{1/3}$$

And, the return point can be calculated using the formula:

$$\text{Return point} = \text{Lower limit} + \frac{\text{Spread}}{3}$$

(c) Major Considerations in Capital Structure Planning

There are three major considerations, i.e. risk, cost of capital and control, which help the finance manager in determining the proportion in which he can raise funds from various sources.

Although, three factors, i.e., risk, cost and control determine the capital structure of a particular business undertaking at a given point of time. The finance manager attempts to design the capital structure in such a manner that his risk and costs are the least and the control of the existing management is diluted to the least extent. However, there are also subsidiary factors like marketability of the issue, maneuverability and flexibility of the capital structure and timing of raising the funds which affect the capital structure planning. Structuring capital is a shrewd financial management decision and is something which makes or mars the fortunes of the company.

As discussed earlier, the three major considerations help the finance manager in determining the proportion in which he can raise funds from various sources. Risk is of cash insolvency and of variation in the expected earnings available to the equity shareholders. Since a business should be at least capable of earning enough revenue to meet its cost of capital and finance its growth. Hence, along with risk as a factor, the finance manager has to consider the cost aspect carefully while determining the capital structure.

The other considerations which the finance manager has to keep in mind while planning for capital structure are corporate taxation, trading on equity i.e.

$$ROE = ROA + \frac{D}{E} [(ROA - V_d \times (1 - T_c))]$$
 Government policies on interest rates and lending priority sectors, legal requirements, marketability, maneuverability, flexibility, timing, dilution in EPS, BVPS and control, size of company, purpose of financing, period of finance, nature of enterprise, requirement of investors and provision for future.

(d) Relevance of Time Value of Money in Financial Decisions

Time value of money means that worth of a rupee received today is different from the worth of a rupee to be received in future. The preference of money now, as compared to future money, is known as time preference for money.

A rupee today is more valuable than a rupee after a year due to several reasons:

- ◆ Risk: There is uncertainty about the receipt of money in future.
- ◆ Preference for Present Consumption: Most of the persons and companies in general, prefer current consumption to future consumption.
- ◆ Inflation: In an inflationary period, a rupee today represents a greater real purchasing power than a rupee a year hence.
- ◆ Investment Opportunities: Most of the persons and the companies have a preference for present money because of availabilities of opportunities of investment for earning additional cash flow.

Many financial problems involve cash flows accruing at different points of time. For evaluating such cash flows an explicit consideration of time value of money is required.