

**PAPER 5: COST MANAGEMENT
MAY 2004**

Question No.1 is compulsory
Answer any four questions from the rest.
Working notes should form part of the answer.
Makes assumption wherever necessary.
(Graph sheet will be provided on request)

Question 1

- (a) State the need for emergence of activity based costing **(4 Marks)**
 (b) Explain the limitation of linear programming **(4 Marks)**
 (c) A company manufactures two products. Each product passes through two departments A and B before it becomes a finished product. The data for a year are as under: **(16 Marks)**

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

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

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

Required:

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

Question 2

- (a) Explain the concept of relevancy of cost in the context of decision making. **(4 Marks)**
 (b) State the merits of cost-plus contracts **(3 Marks)**
 (c) A single product company operates a system of standard costing. The following data relate to actual output, sales, costs and variances for a month: **(12 Marks)**

Actual output	18,000 units
	Rs.
Actual sales and costs incurred:	
Sales	<u>12,15,000</u>
Direct materials purchased and used 63,000 kg	2,04,750
Direct wages	2,12,040

Variable overheads	2,77,020
Fixed overheads	<u>3,25,000</u>
Total costs	<u>10,18,810</u>
Profit	<u>1,96,190</u>

Standard wage rate is Rs.6 per hour. Budgeted output for the month is 20,000 units. Variances are:

Direct materials	--	Price variance	15,750A
		Usage variance	27,000A
Direct labour	--	Rate variance	6,840A
		Efficiency variance	10,800 F
Variable overheads	--	Efficiency variance	14,400F
		Expense variance	3,420A
Fixed overheads	--	Expense variance	25,000A
		Sales price variance	45,000F

Required:

- Present the original budget along with cost sheet showing the standard cost and profit per unit
- Calculate the sale gross margin volume and fixed overheads volume variances
- Prepare an operating statement reconciling the budgeted profit with actual profit.

Question 3

- Trace the stages involved in target costing. **(4 Marks)**
- Explain the concept of learning curve and discuss its relevance to pricing decisions **(4 Marks)**
- A company has a normal manufacturing capacity of 1,50,000 units of a product per annum. The actual costs based on this output achieved during the last year were as under; **(11 Marks)**

	Rs.
Direct materials	36
Direct labour	20
Variable overheads	20
Fixed overheads	20
The budget for the next year envisages the following increases:	
Direct materials	33 1/3%
Direct labour	10%
Variable overheads	5%
Fixed overheads	15%

In view of the substantial increase in material costs, the company explored the possibilities of using a substitute material. The company has been able to identify a cheaper source of direct materials which will cost Rs.40 per unit of output. The tests reveal that the use of cheaper direct material as above will make the following impact on the costs:

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

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

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

Required:

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

Question 4

- (a) What are the shortcomings in the use of simulation approach in solving operations research problems? **(3 Marks)**
- (b) State the benefits accruing from Enterprise Resource Planning (ERP) **(4 Marks)**
- (c) A company manufactures three products namely A, B and C. The current pattern of sales of A, B and C is in the ratio of 8:2:1 respectively. The relevant data are as under: **(12 Marks)**

Products	A	B	C
Selling price per units Rs.	130	230	417
Raw materials per unit Kg.	0.50	1.2	2.5
Direct materials per unit Kg.	0.25	--	--
Skilled labour hours/unit Kg.	4	6	8
Semi-skilled labour hours per unit	2	2	3
Variable overheads Rs. Per units	20	40	80

The prices of raw materials and direct materials respectively are Rs.100 and Rs.40 per Kg. The wage rates of skilled and semi-skilled labour respectively are Rs.6 and Rs.5. Each operator works 8 hours a day for 25 days in a month.

The position of inventories are as under:

	Raw materials Kg.	Direct materials Kg.	A units	B units	C units
Opening	600	400	400	100	50
Closing	650	260	200	300	50

The fixed overheads amount to Rs.2,00,000 per month and the company desires a profit of Rs.1,20,000 per month.

You are required to prepare the following for a month:

- (i) Sales budget in quantity and value.
- (ii) Production budget showing the quantity to be manufactured.
- (iii) Purchase budget showing the quantity and value.
- (iv) Direct labour budget showing the number of workers and wages.

Question 5

- (a) Explain the critical success factors for the implementation of a programmed of Total Quality Management (TQM). **(4 Marks)**
- (b) A hotel operated by a company has 180 single rooms and 60 double rooms. The rent of the double rooms is set at 160% of the rent of the single rooms. The operational costs per day per room are estimated as under: **(7 Marks)**

	Single Rooms (Rs.)	Double Rooms (Rs.)
Variable costs	300	500
Fixed costs	500	780

The average occupancy of both the single rooms and double rooms is expected to be 85% throughout a year of 365 days. In fixing the room rent, the company desires to earn a margin of safety of 20%. The hotel has to pay a tax of 20% on its tariff.

Required:

- (i) Calculate the tariff per day per (1) Single room and (2) Double room.
- (ii) The hotel intends to reserve the normal occupancy of 12 single rooms for one of its valued corporate customers at a discount (excluding tax) of 10% of the rent. What increase in the occupancy of the remaining single room days is required to compensate the loss arising from the discount.

(c) The budgeted data relating to two products manufactured by a company for a month are as under:

(8 Marks)

	Product A	Product B
Selling Price	300	200
Variable manufacturing costs	160	60
Sales commission	60	40

Each unit of product incurs costs in the company's two departments P and Q. The total capacity available for the month under review is budgeted to be 1,400 hours in department P and 2,000 hours in department Q. The capacity costs amount to Rs.14,000 and Rs.20,000 respectively per month for P and Q irrespective of the level of usage made of it. The number of hours required in each of these departments to complete one unit of output is as under :

	A	B
Department P	2	4
Department Q	5	4

The maximum output which the company can sell in the month is restricted to 400 units of either of the products.

You are required to formulate the Linear Programming (LP) model and solve it graphically to determine the optimal product mix and profit.

Question 6

- (a) Outline the objectives of Materials Requirement Planning (MRP) **(4 Marks)**
- (b) A project is composed of seven activities as per details given below: **(8 Marks)**

Activity	Normal time (days)	Crash time (days)	Normal cost Rs.	Crash cost Rs.
1-2	4	3	1,500	2,000
1-3	2	2	1,000	1,000
1-4	5	4	1,875	2,250
2-3	7	5	1,000	1,500
2-5	7	6	2,000	2,500
3-5	2	1	1,250	1,625
4-5	5	4	1,500	2,125

Indirect cost per day of the project is Rs.500

Required :

- (i) Draw the project net work.
- (ii) Determine the critical path and its duration.
- (iii) Find the optimum duration and the resultant cost of the project.

(c) The company manufactures a component which requires a high degree of precision. Each unit of the component is therefore subjected to a strict quality control test to ascertain whether there is any defect in it. The defects are classified into three categories viz, A,B and C. If defect A occurs in the output, it is scrapped. If defect B or C occurs in the output, it is reworked to rectify the defect. The machine time required to rework defect B component is 30 minutes and that for defect C is 45 minutes. The probabilities are as under:

(7 Marks)

	Defect A	Defect B	Defect C
Defect occurring	0.15	0.20	0.10

Defect not occurring 0.85 0.80 0.90

Using the following random numbers, simulate a study of 10 items of output and determine the number of items with no defects, number of items scrapped due to occurrence of defect A and the total machine time required for rework due to occurrence of defect B or C:

Random number for defect A: 48 55 91 40 93 01 83 63 47 52
Random number for defect B: 47 36 57 04 79 55 10 13 57 09
Random number for defect C: 82 95 18 96 20 84 56 11 52 03