

**PAPER 5 : COST ACCOUNTING & COST SYSTEMS
MAY 2003**

Question No.1 is compulsory Answer any four questions from the rest.

Working notes should form part of the answer.

Make assumptions wherever necessary

(Area under standard normal curve table will be provided on request)

Question 1

- (a) Explain the steps involved in target costing approach to pricing **(4 Marks)**
 (b) Enumerate the industrial applications of linear programming. **(4 Marks)**
 (c) A company manufactures two products EXE and WYE, which pass through two of its departments exclusively used for them. A market research study conducted by the company reveals that the company can sale either 38,500 units of EXE or 31,500 units of WYE in a years. The manufacturing cost and selling price details are as under: **(16 Marks)**

	EXE		WYE	
		Rs.		Rs.
Selling price per unit		375		540
Costs:				
Department 1:				
Direct Materials		58		100
Direct Labour	5 hours	50	7.5 hours	75
Department 2:				
Direct materials		21		26
Direct labour	7.5 hours	90	10 hours	120
Overheads		Dept.1		Dept.2
Variable overhead rate per direct labour hour		Rs.2.40		Rs.3.60
Fixed overhead		Rs.5,00,000		Rs.10,00,000
Budgeted overhead labour hours		1,75,000		2,80,000

Since the quantity which can be sold exceeded the production capacity, the company has been considering the use of sub-contracting production facilities. Accordingly, when tenders were floated, two contractors responded as under:

Contractor DS offers to produce upto a maximum of 17,500 units of EXE OR 14,000 units of WYE in a year for the type of work done by department 1 of the company. The price charged by DS is Rs.138 per unit of EXE and Rs.212 per unit of WYE. These prices included the cost of direct materials used in department 1 of the company.

Contractor DW can produce upto a maximum of 11,200 units of EXE and 7,000 units of WYE in a year for the type of work done by department 2 of the company. The price charged by DW is Rs.150 per unit of EXE and Rs.192 per unit of WYE. These prices included the cost of direct materials used in department 1 of the company.

Required :

- (i) If the company does not wish to use the sub-contracting facility, which of the two products and in what quantity should be produced and sold by the company by using its own manufacturing capacity to earn maximum profit? Calculate the resultant maximum profit.
 (ii) If the company wishes to produce either 38,500 units of EXE or 31,500 units of WYE by using sub-contracting facility, state which of the two products should be produced to maximize the profits. Calculate the resultant maximum profit.

Question 2

- (a) Outline the key attributes of an operational database. **(4 Marks)**
 (b) State the major features of Enterprise Resource Planning (ERP). **(3 Marks)**

- (c) A company, which uses standard marginal costing, furnishes the following details relating to a single product manufactured and sold in a quarter: **(12 Marks)**

	Budget	Actual
Sales units	6,000	6,400
	(Rs.'000)	(Rs.'000)
Sales	1,500	1,696
Direct materials	240	270
Direct labour	360	416
Variable overheads	600	648
Total variable costs	1,200	1,334

The sales budget is based on the expectation of the company's estimate of market share of 12%. The market report reveals that the actual sales of the product in the whole country for the quarter is 60,000 units.

Further data are given as under:

	Standard	Actual
Direct material price per kg.	Rs.8	Rs.7.50
Direct labour rate per hour	Rs.6	Rs.6.40

Required :

i. Compute the following variances for the quarter :

- Gross margin sales
 - Market size variance
 - Market share variance
 - Volume variance.
- Sales price variance
- Direct materials usage and price variances
- Direct labour efficiency and rate variances
- Variable overheads efficiency and expense variances.

ii. Prepare an operating statement reconciling the budgeted contribution with actual contribution.

Question 3

- (a) State the main types of information which will be required by a manager to implement the balanced score card approach to performance measurement. **(4 Marks)**
- (b) Distinguish between a slack variable and an artificial variable in linear programming. **(3 Marks)**
- (c) SV Ltd., manufactures a single product. The selling price of the product is Rs.95 per unit. The following are the results obtained by the company during the last two quarters : **(12 Marks)**

	Quarter 1	Quarter 2
Sales units	5,100	4,800
Production units	5,500	4,500
	Rs.	Rs.
Direct material A	66,000	54,000
B	55,000	45,000
Manufacturing wages	1,56,750	1,38,000
Factory overheads	86,000	83,000
Selling overheads	79,000	73,000

The company estimates its sales for the next quarter to range between 5,500 units and 6,500 units, the most likely volume being 6,000 units. The manufacturing programme will match with the sales quantity such that no increase in inventory of finished goods is contemplated in the next quarter. The following price and cost changes will, however, apply to the next quarter:

- The price of direct material B will increase by 10%. There will be no change in the price of direct material A.

- The wage rates will go up by 8%. If the production volume increases beyond 5,500 units, overtime premium of 50% is payable on the increased volume due to overtime working to be done by the variable labour complement.
- The fixed factory and selling expenses will increase by 20% and 25% respectively.
- A discount in the selling price of 2% is allowed on all sales made at 6,500 units level of output. The selling price, however, will remain unaltered, if the volume of output is below 6,500 units.

While operating at a volume of output of 6,500 units in the next quarter, the company intends to quote for an additional volume of 2,000 units to be supplied to a Government department for its captive consumption. The working capital requirement of this order is estimated at 80% of the sales value of the Government order. The company desires a return of 20% on the capital employed in respect of this order.

Required :

- (i) Prepare a flexible budget for the next quarter at 5,500 , 6,000 and 6,500 units levels and determine the profit at the respective volumes.
- (ii) Calculate the lowest price per unit to be quoted in respect of the Government order for 2,000 units.

Question 4

- (a) State the areas in which the application of learning curve theory can help a manufacturing organization. **(4 Marks)**
- (b) In what circumstances can penetration pricing policy be adopted ? **(3 Marks)**
- (c) A company manufactures several products of varying levels of designs and models. It uses a single overhead recovery rate based on direct labour hours. The overhead incurred by the company in the first half of the year are as under: **(12 Marks)**

	Rs.
Machine operation expenses	10,12,500
Machine maintenance expenses	1,87,500
Salaries of technical staff	6,37,500
Wages and salaries of stores staff	2,62,500

During this period, the company introduced activity based costing system and the following significant activities were identified.

- Receiving materials and components.
- Set up of machines for production runs
- Quality inspection.

It is also determined that:

- The machine operation and machine maintenance expenses should be apportioned between stores and production activity in 20:80 ratio.
- The technical staff salaries should be apportioned between machine maintenance, set up and quality inspection in 30:40:30 ratio.

The consumption of activities during the period under review are as under:

- Direct labour hours worked	40,000
- Direct wages rate Rs.6 per hour	
- Production set-ups	2,040
- Material and component consignments received from suppliers	1,960
- Number of quality inspection carried out	1,280

The data relating to two products manufactured by the company during the period are as under:

	Products	
	P	Q
Direct material costs	Rs.6,000	4,000
Direct labour hours	960	100

Direct material consignments received	48	52
Production runs	36	24
Number of quality inspections done	30	10
Quantity produced (units)	15,000	5,000

A potential customer has approached the company for the supply of 24,000 units of a component K to be delivered in lots of 3,000 units per quarter. The job will involve an initial design cost of Rs.60,000 and the manufacture will involve the following per quarter:

Direct material costs	Rs.12,000
Direct labour hours	300
Production runs	6
Inspection	24
Number of consignments of direct materials to be received	20

The company desires a mark up of 25% on cost.

Required :

- (i) Calculate the cost of products P and Q based on the existing system of single overhead recovery rate.
- (ii) Determine the cost of products P and Q using activity based costing system.
- (iii) Compute the sales value per quarter of component K using activity based costing system.

Question 5

- (a) State the assumptions of Cost – volume – profit analysis. **(4 Marks)**
- (b) A company using a continuous manufacturing operation achieves an output of 3 kg. per hour. The selling price is Rs.450 per kg. The raw material cost is Rs.125 per kg of output and the direct labour and variable overheads amount to Rs.316 per kg. of output. The company has provided an expenditure of Rs.640 on maintenance and Rs.6,400 on break down repairs per month in its budget. Breakdowns averaging 300 hours per month occur due to mechanical faults. These could be reduced or eliminated, if additional maintenance on the following scale were undertaken: **(7 Marks)**

Break down hours	Maintenance costs (Rs.)	Repair Costs (Rs.)
0	20,480	0
60	10,240	1,920
120	5,120	2,560
180	2,560	3,840
240	1,280	5,120
300	640	6,400

Using the incremental cost and incremental revenue concept, you are required to :

- (i) Determine the optimum level upto which breakdown can be reduced to increase production:
- (ii) Calculate the additional profits obtainable at that level as compared to the present situation.
- (c) A company has three factories and four customers. The company furnishes the following schedule of profit per unit on transportation of its goods to the customers in rupees: **(8 Marks)**

	Customers				
Factory	A	B	C	D	Supply
P	40	25	22	33	100
Q	44	35	30	30	30
R	38	38	28	30	70
Demand	40	20	60	30	

You are required to solve the transportation problem to maximize the profit and determine the resultant optimal profit.

Question 6

- (a) Outline the limitations of negotiated method of transfer pricing. **(4 Marks)**

- (b) With a view to improving the quality of customer services, a Bank is interested in making an assessment of the waiting time of its customers coming to one of its branches located in a residential area. This branch has only one teller's counter. The arrival rate of the customers and the service rate of the teller are given below:

Time between two consecutive arrivals of customers (in minutes)	3	4	5	6	7
Probability	0.17	0.25	0.25	0.20	0.13
Service time by the teller (in minutes)	3	4	5	6	7
Probability	0.10	0.30	0.40	0.15	0.05

You are required to simulate 10 arrivals of customers in the system starting from 11AM and show the waiting time of the customers and idle time of the teller.

Use the following random numbers taking the first two random numbers in two digits each for first trail and so on:

11,56,23,72,94,83,83,02,97,99,83,10,93,34,33,53,49,94,37 and 97

- (c) A project consist of the following activities, whose time estimates are given against each as under: **(8 Marks)**

Activity	Estimated duration (weeks)		
	Optimistic	Most likely	Pessimistic
1-2	3	6	15
1-3	2	5	14
1-4	6	12	30
2-5	2	5	8
2-6	5	11	17
3-6	3	6	15
4-7	3	9	27
5-7	1	4	7
6-7	4	19	28

Required :

- Draw the project net work.
- Find the expected duration and variance of each activity.
- Determine the critical path and the expected project duration.
- What is the probability that the project will be completed in 38 weeks?
- What project duration will have 95% chance of completion. ($Z_{0.95} = 1.65$)

Given :

Z	0.21	0.41	0.82
Ø	0.0832	0.1591	0.2939