

Paper 15 – Strategic Cost Management – Decision Making



Paper – 15

Strategic Cost Management – Decision Making

Full Marks : 100

Time allowed: 3 hours

Section - A

1. Answer the following and each question carries 2 marks. [10×2=20]

- (i) A company produces a product which is sold at a price of ₹80. Its Variable cost is ₹32. The company's Fixed cost is ₹11, 52,000 p.a. The company operates at a margin of safety of 40%.

The total sales of the company are:

- (a) 4000 units
(b) 40,000 units
(c) 30,000 units
(d) 20,000 units

- (ii) For a Learning Curve percentage of 72%, the time to be taken to complete the 4th unit of a 12-unit job involved in the assembly line, if the initial unit requires 80 hours, will be

- (a) 43.50 hrs
(b) 41.47 hrs
(c) 46.71 hrs
(d) 40.95 hrs

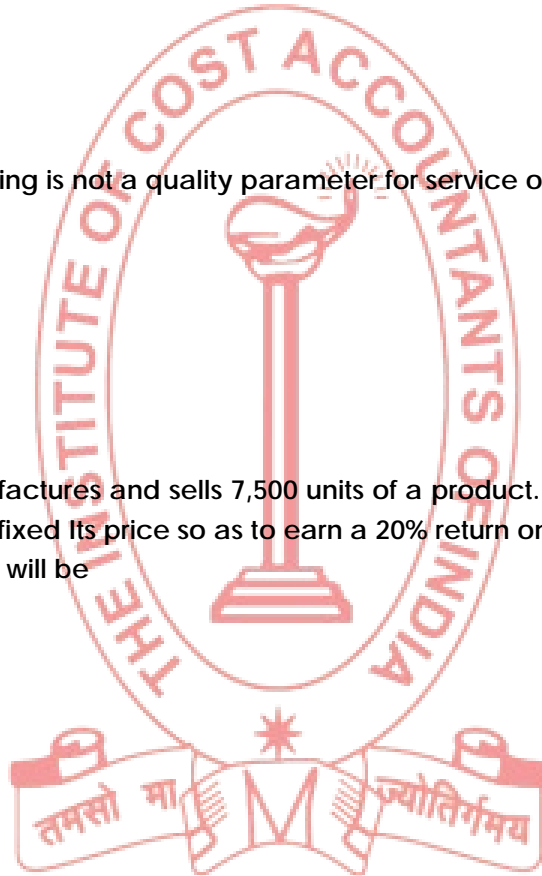
- (iii) The following information relates to ABC Ltd.

Activity level	60%	80%
Variable costs (₹)	12,000	16,000
Fixed costs (₹)	20,000	22,000

The differential cost for 20% capacity is:

- (a) ₹4,000
(b) ₹2,000
(c) ₹6,000
(d) ₹5,000

- (iv) Which of the following is NOT a method of transfer pricing?
- (a) Cost plus transfer price
 - (b) Internal price plus transfer price
 - (c) Market-based transfer price
 - (d) Two part transfer price
- (v) If project A has a net present value (NPV) of ₹ 30,00,000 and project B has an NPV of ₹ 50,00,000, what is the opportunity cost if project B is selected?
- (a) ₹ 23,00,000
 - (b) ₹ 30,00,000
 - (c) ₹ 20,00,000
 - (d) ₹ 50,00,000
- (vi) Which of the following is not a quality parameter for service organizations?
- (a) Consistency
 - (b) Friendliness
 - (c) Durability
 - (d) Promptness
- (vii) Desktop Co. manufactures and sells 7,500 units of a product. The full cost per unit is ₹100. The Company has fixed its price so as to earn a 20% return on an investment of ₹9,00,000. Target selling price will be
- (a) ₹ 100
 - (b) ₹ 124
 - (c) ₹ 200
 - (d) None of these
- (viii) Twin Ltd. uses JIT and back flush accounting. It does not use a raw material stock control account. During March 2019, 10000 units were produced and sold. The standard cost per unit is ₹ 150 which includes materials of ₹ 60. During March 2019, ₹ 9,90,000 of conversion costs were incurred. The debit balance in cost of goods sold account for March 2019 should be
- (a) ₹ 14,10,000
 - (b) ₹ 14,80,000
 - (c) ₹ 15,90,000
 - (d) ₹ 16,20,000



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(ix) The preparation and use of standard costs, their comparison with actual costs and the measurement and analysis of variances to originating causes is defined as:

- (a) Marginal Costing
- (b) Standard Costing
- (c) Throughput Costing
- (d) Kaizen Costing

(x) In the context of Critical Path Analysis, the portion of the float of an activity which cannot be consumed without affecting adversely the float of the subsequent activities is called

- (a) Free float
- (b) Interfering float
- (c) Independent float
- (d) Total float

Answer:

(i) (b) $SP ₹ 80 - VC ₹ 32 = \text{Contribution } ₹ 48$

F.C. ₹ 11,52,000

B.E.P. = $₹ 11,52,000 / ₹ 48 = 24,000$ units

MOS = 40% and hence B.E.P. = 60%

Total sales = = 40,000 units. $(24,000 \times 100/60 = 40,000)$

(ii) (b) At 72% Learning Curve, T-4 - Time taken by the 4th Unit = $80 (.72)(.72) = 41.47$ hrs.

Note: In the arithmetic method followed above, every time the number of repetitions doubles, the time to perform the activity is reduced by the Learning Curve Coefficient.

(iii) (c) Explanation: Differential Costs = Differences in Fixed and Variable Cost = $₹(4000 + 2,000) = ₹6,000$.

(iv) (b) Internal price plus transfer price

The internal price is just another name for the TP. So it is not a method of transfer pricing.

(v) (b) ₹ 30,00,000

Explanation: Opportunity cost represents the next best alternative foregone.

If B is chosen, A is being foregone and hence the NPV of 30,00,000 is the present value of the opportunity lost.

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(vi) (c) Durability

Opportunity Cost of Project B is ₹ (50,00,000 – 30,00,000) = ₹ 20,00,000

(vii) (b) ₹ 124

Target Sale Price per unit = Full Cost + Target Profit

$$= ₹ 100 + \{(9,00,000 \times 20\%)\} / 7500 = ₹ (100 + 24) = ₹ 124$$

(viii) (c) ₹ 15,90,000

Standard cost of goods sold (10,000 units @ ₹150)	₹15,00,000
Less : Std. material cost (10,000 @ ₹ 60)	<u>₹6,00,000</u>
Standard conversion cost	₹9,00,000
Conversion cost incurred	<u>9,90,000</u>
Excess charged to cost of goods sold a/c. (debit)	90,000
Total debit balance of cost of goods sold Account = ₹ 15,00,000 + ₹90,000	
	= ₹ 15,90,000

(ix) (b) Explanation: It is standard costing that involves the process described.

(x) (b) Explanation : Interfering float is that part of the total float which causes a reduction in the float of the successor activities. It is the difference between the latest finish time of the activity in question and the earliest starting time of the following activity or zero, whichever is larger.

Section – B

Answer any five questions from question nos. 2 to 8. Each question carries 16 marks.

2. (a) Explain the concepts of Throughput Accounting. 8

(b) Explain Network Analysis narrating its practical applications. 8

Answer:

(a) **Throughput Accounting (TA):** Variable cost accounting presentation based on the definition of throughput (sales minus material and component costs). Sometimes, it is referred to as super variable costing because only material costs are treated as variable.--- CIMA

Throughput Accounting is a management accounting technique used as a performance measure in the theory of constraints. It is the business intelligence used for maximizing profits. It seeks to increase the velocity or speed of production of products and services keeping in view the constraints. It is based on the concept that a company must determine its overriding goal and then it should create a system that clearly defines the main capacity constraint that allows it to maximize that goal. The changes that this concept causes are startling.

Throughput Concepts

- (i) **Throughput:** Throughput is the excess of sales value over the totally variable cost.
- (ii) **Totally Variable Cost:** This cost is incurred only if a product is produced. In many cases only direct materials are considered as totally variable cost. Direct labour is not totally variable, unless piece rate wages are paid.
- (iii) **Bottleneck Resource:** It is a resource within a company that limits its total output. For example, it can be a machine that can produce only a specified amount of a key component in a given time period, thereby keeping overall sales from expanding beyond the maximum capacity of that machine. There may be more than one capacity constraint in a company.
- (iv) **Throughput (or Cycle) Time:** Throughput (or cycle) time is the average time required to convert raw materials into finished goods ready to be shipped to customer. It includes the time required for activities such as material handling, production processing, inspecting and packaging.
- (v) **Throughput Time Ratio:** It is the ratio of time spent adding customer value to products and services divided by total cycle time. It is also known as the 'ratio of work content to lead time'.
- (vi) **Total Factory Cost:** With the exception of material costs, in the short run, most factory costs (including direct labour) are fixed. These fixed costs can be grouped together and called total factory costs (TFC).

(b) Net Work Analysis

Network analysis is the general name given to PERT and CPM techniques which can be used for planning, management and control of a project.

Network is a graphical representation of all the activities and events of a project arranged in a logical and sequential order. In this context, activity is the actual performance of the job which consumes resources like time, human resources, money, material, etc. An event refers to the starting point or completion point of a job.

Net work Analysis acts as a management tool for breaking down projects into components or individual activities and recording the result on a flow chart or network diagram. These results generally reveal information that is used to determine duration, resource limitations and cost estimates associated with the project.

A project is a combination of interrelated activities all of which must be executed in a certain order for its completion. Project management and efficient resource allocation are two critical aspects of the production and operations managers' responsibilities. Since a project is non-repetitive and temporal in nature, the mode of management differs from the usual job shop or other related types of scheduling.

Network analysis enables us to take a systematic quantitative structural approach to the problem of managing a project through to successful completion. Also, since it has a graphical representation, it can be easily understood and used by those with a less technical background.

Avenues of Application

1. Construction of Buildings and Complexes
2. Ship building
3. Satellite mission development
4. Installation of a pipe line project
5. Research & Development
6. Inventory Planning & Control
7. Traffic flow Control
8. Long Range Planning
9. And so on ...

PERT has the ability to cope with uncertainty in activity completion times while CPM emphasizes on the trade-off between cost of the project and its overall completion time.

3. (a) A Company manufactures two products X and Y. Product X requires 8 hours to produce while Y requires 12 hours. In April, 2018, of 22 effective working days of 8 hours a day, 1,200 units of X and 800 units of Y were produced. The company employs 100 workers in production department to produce X and Y. The budgeted hours are 1, 86,000 for the year. Calculate Capacity, Activity and Efficiency ratios and establish their relationship. 8
- (b) Explain and enumerate 'Costs of Quality' under different groups. 8

Answer:

(a)

		(Hours)
Standard hours of production		
Product X	(1,200 units x 8 hrs.)	9,600
Product Y	(800 units x 12 hrs.)	9,600
Total standard hours		19,200
Actual hours worked		17,600
Budgeted hours per month		15,500

$$\text{Capacity Ratio} = \frac{\text{Actual Hours Worked}}{\text{Budgeted hours p.m.}} \times 100 = \frac{17,600 \times 100}{15,500} = 113.55\%$$

$$\text{Efficiency Ratio} = \frac{\text{Standard hours of production}}{\text{Actual Hours Worked}} \times 100 = \frac{19,200 \times 100}{17,600} = 109.09\%$$

$$\text{Activity Ratio} = \frac{\text{Standard hours of production}}{\text{Budgeted hours p.m.}} \times 100 = \frac{19,200 \times 100}{15,500} = 123.87\%$$

Relationship of Ratios

$$\text{Activity Ratio} = \frac{\text{Efficiency Ratio} \times \text{Capacity Ratio}}{100} = \frac{109.09 \times 113.55}{100} = 123.87$$

(b) Costs of Quality

Costs of quality have a great implication in overall cost of the product or services. Off late, organizations have started appreciating the high cost of poor quality. The most obvious consequence occurs when poor quality creates dissatisfied customers and eventually leads to loss of business. However quality has many other costs, which can be divided into two categories. The first category consists of quality control costs necessary for achieving high quality. These are of two types viz. prevention costs and appraisal costs. The second category consists of the cost consequences of poor quality, which are called quality failure costs. These include external failure costs and internal failure costs.

Prevention costs are all costs incurred in the process of preventing quality lapses to occur. They include quality planning costs, such as the costs of developing and implementing a quality plan. Also included are the costs of product and process design, from collecting customer information to designing processes that achieve conformance to specifications. Employee training in quality measurement is included as part of this cost, as well as the costs of maintaining records of information and data related to quality.

Appraisal costs are incurred in the process of uncovering defects. They include the cost of quality inspections, product testing, and performing audits to make sure that quality standards are being met. Also included in this category are the costs of worker time spent measuring quality and the cost of equipment used for quality appraisal.

Internal failure costs are associated with discovering poor product quality before the product reaches the customer site. One type of internal failure cost is rework, which is the cost of correcting the defective item. Sometimes the item is so defective that it cannot be corrected and must be thrown away. This is called scrap, and its costs include all the material, labour, and machine cost spent in producing the defective product.

External failure Costs are incurred when inferior products are delivered to customers. They include cost of handling customer complaints, warranty replacements, repairs of returned products and costs arising from a damaged company reputation.

4. XYZ. Limited makes three main products, using broadly the same production methods and equipment for each. A conventional product costing system is used at present, although Activity Based Costing (ABC) system is being considered. Details of the three products, for a typical period are:

	Labour Hours per Unit	Machine Hours per unit	Material (₹ Per unit)	Volumes (Units)
Product X	1 ½	3 ½	25	3,500
Product Y	½	2	15	2,250
Product Z	2	5	30	6,000

Direct labour costs are ₹8 per hour and production overheads are absorbed on a machine hour basis. The rate for the period is ₹18 per machine hour.

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Further analysis shows that the total of production overheads can be divided as follows

	%
Costs relating to set-ups	30
Costs relating to machinery	25
Costs relating to materials handling	22
Costs relating to inspection	23
Total production overhead	100

The following activity volumes are associated with the product line for the period as a whole.

	Number of Set-ups	Number of movements of materials	Number of Inspections
Product X	65	15	150
Product Y	110	26	190
Product Z	485	79	570
	660	120	910

You are required:

- (a) To calculate the cost per unit for each product using conventional methods.
 (b) To calculate the cost per unit for each product using ABC principles. 4+12

Answer:

- (a) Computation of cost per unit using Conventional Methods:

Computation of Cost

	X	Y	Z
	₹	₹	₹
Materials	25	15	30
Labour	12	4	16
Overheads	63	36	90
Factory Cost	100	55	136

- (b) Under ABC Costing

Total overheads		₹
X	= 3500 x 3.5 x 18	= 2,20,500
Y	= 2250 x 2 x 18	= 81,000
Z	= 6000 x 5 x 18	= 5,40,000
		8,41,500

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	Setup Cost (₹)	Machine Cost (₹)	Material Handling Cost (₹)	Inspection Expenses (₹)	Total (₹)
Costs	2,52,450 (30%)	2,10,375 (25%)	1,85,130 (22%)	1,93,545 (23%)	8,41,50 0 (100%)
Cost Driver	No. of setups	Machine hours	No. of Moment of Materials	No. of Inspections	
Cost driver rates	382.50 (252450/660)	4.5 (210375/46750)	1542.75 (185130/120)	212.69 (193545/910)	

Computations per unit

Product / Element	X	Y	Z
Units Produced	3500	2250	6000
Set up cost per unit (₹)			
i. Number of Set ups	65	110	485
ii. Set up Cost for the Product	24863	42075	185512
iii. Set up Cost per Unit	7.10	18.70	3092
Machine cost per unit (₹)			
iv. Machine Hours	12250	4500	30000
v. Machine Cost for the Product	55125	20250	135000
vi. Machine Cost per Unit	15.75	9.00	22.50
Material handling cost per unit (₹)			
i. Number of Movements	15	26	79
ii. Material handling Cost for the Product	23141	40112	121877
iii. Material handling Cost per Unit	6.61	17.82	20.31
Inspection cost per unit (₹)			
i. Number of Inspections	150	190	570
ii. Inspection Cost for the Product	31903	40411	121233
iii. Inspection Cost per Unit	9.12	17.96	20.21

Cost per unit under ABC costing

Product / Element	X (₹)	Y (₹)	Z (₹)
Materials	25.00	15.00	30.00
Labour	12.00	4.00	16.00
Overheads			
Setup Cost	7.10	18.70	30.92
Machine cost	15.75	9.00	22.50
Material Handling Cost	6.61	17.82	20.31
Inspection Cost	9.12	17.96	20.21
Total Cost	75.58	82.48	139.94

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5. (a) SV Ltd, engaged in the manufacture of four products, has prepared the following budget for 2018.

Products	A	B	C	D
Production Units	20,000	5,000	25,000	15,000
Selling Price ₹/unit	21.75	36.75	44.25	64.00
Direct Materials ₹/unit	6.00	13.50	10.50	24.00
Direct Wages ₹ /unit	7.50	10.00	18.00	24.00
Variable Overheads ₹ /unit	2.25	5.00	6.00	6.50
Fixed Overheads ₹ p.a.	75,000	25,000	2,25,000	1,80,000

When the budget was discussed, it was proposed that the production of C should be increased by 10,000 units for which capacity existed in 2018.

It was also decided that for the next year i.e. 2019, the production capacity should be further increased by 25,000 units over and above the increase of 10,000 units envisaged as above for 2018. The additional production capacity of 25,000 units should be used for the manufacture of product 'B' for which new production facilities were to be created at an annual fixed overhead cost of ₹35,000. The direct material costs of all the four products were expected to increase by 10% in 2019 while the other costs and selling prices would remain the same.

Required:

- (i) Find the profit for 2018 on the assumption that the existing capacity of 10,000 units is utilised for product 'C' to maximize the profit.
- (ii) Prepare a statement of profit for 2019.
- (iii) Assuming that the increase in the output of product 'B' may not fully materialise in the year 2019, find the number of units of product B to be sold in 2019 to earn the same overall profit as in 2018. 3+3+3

(b) What is Benchmarking? What are the types of Benchmarking? 2+ 5

Answer:

5. (a)

- (i) Statement showing computation of profit for the year 2018

Sr.	Particulars		A	B	C	D	Total
i	No. of Units		20000	5000	35000	15000	
ii	Selling Price	₹/unit	21.75	36.75	44.25	64.00	
iii	Variable Cost	₹/unit	16.35	28.50	34.50	54.50	
iv	Contribution	₹/unit	6.00	8.25	9.75	9.50	
v	Total Contribution	₹	1,20,000	41,250	3,41,250	1,42,500	6,45,000
vi	Fixed Cost	₹	75,000	25,000	2,25,000	1,80,000	5,05,000
vii	Profit	₹					1,40,000

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(ii) Statement showing computation of profit for the year 2019

Sr.	Particulars		A	B	C	D	Total
i	No. of Units		20000	30000	35000	15000	
ii	Selling Price	₹/unit	21.75	36.75	44.25	64.00	
iii	Contribution	₹/unit	5.40	6.90	8.70	7.10	
iv	Total Contribution	₹	1,08,000	2,07,000	3,04,500	1,06,500	7,26,000
v	Fixed Cost	₹	75,000	60,000	2,25,000	1,80,000	5,40,000
vi	Profit	₹					1,86,000

(iii) In order to get profit of 2018, the contribution to be recovered is as follows:

Particulars	₹
Profit for the year 2018	1,40,000
Revised fixed cost	5,40,000
Total contribution required	6,80,000
Contribution of A,C & D	5,19,000
Contribution to be recovered from B	1,61,000

No. of units required to be sold of B – $161000/6.90 = 23,333$ units.

Additional units required – $23333-5000 = 18333$

(b) **Benching Marking:** The practice of setting targets using external information is known as 'Bench marking'. Benchmarking is the continuous process of enlisting the best practices in the world for the process, goals and objectives leading to world-class levels of achievement.

Types of Benchmarking:

- (i) **Product Benchmarking (Reverse Engineering):** is an age old practice of product oriented reverse engineering. Every organization buys its rival's products and tears down to find out how the features and performances etc., compare with its own products. This could be the starting point for improvement.
- (ii) **Competitive Benchmarking:** This has moved beyond product-oriented comparisons to include comparisons of the processes with those of the competitors. In this type, the processes studied may include marketing, finance, HR, R&D etc.,
- (iii) **Process Benchmarking:** is the activity of measuring discrete performance and functionality against organizations' performance in excellent analogous business process e.g. for supply chain management – the best practice would be that of Mumbai Dubbawallas.
- (iv) **Internal Benchmarking:** is an application of process benchmarking, within an organization by comparing the performance of similar business units or business process.
- (v) **Strategic Benchmarking:** differs from operational benchmarking in its scope. It helps to develop a vision of the changed organizations. It will develop core competencies that will help sustained competitive advantage.

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(vi) **Global Benchmarking:** is an extension of Strategic Benchmarking to include benchmarking partners on a global scale. e.g. Ford Co. of USA benchmarked its A/c payable functions with that of Mazada in Japan and found to its astonishment that the entire function was managed by 5 persons as against 500 in Ford.

6. (a) A small maintenance project consists of the following twelve jobs whose precedence relations are identified with their node number:

Job (i,j) : (1,2) (1,3) (1,4) (2,3) (2,5) (2,6)

Duration (in days) : 10 4 6 5 12 9

Job (i,j) : (3,7) (4,5) (5,6) (6,7) (6,8) (7,8)

Duration (in days) : 12 15 6 5 4 7

(i) Draw an arrow diagram representing the project.

(ii) Calculate earliest start, earliest finish, latest finish time for all the jobs.

(iii) Find the critical path and project duration.

(iv) Tabulate total float, free float and independent float.

3+3+3+3

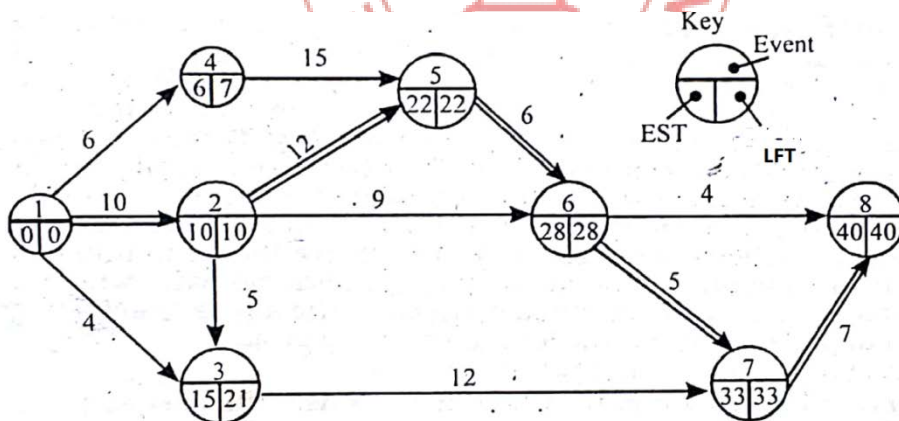
(b) Narrate 2 routine business situations, where Pareto Analysis is useful.

2+2

Answer:

(a)

(i) The network diagram of the project corresponding to normal duration is given below:



(ii) Statement showing Earliest Start Time (EST), Earliest Finish Time (EFT), Latest Start Time (LST) and Latest Finish Time (LFT) for all jobs.

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Jobs	Duration in days	Earliest Time		Latest Time		Slack of event		Total Float (TF)	Free Float (FF)	Independen t Float
		Start (EST)	Finish (EFT)	Start (LST)	Finish (LFT)	at start of activity	at end of activity			
1	2	3	4	5	6	7	8	9	10	11
1-2	10	0	10	0	10	0	0	10-10=0	0-0=0	0-0=0
1-3	4	0	4	17	21	0	6	21-4=17	17-6=11	11-0=11
1-4	6	0	6	1	7	0	1	7-6=1	1-1=0	0-0=0
2-3	5	10	15	16	21	0	6	21-15=6	6-6=0	0-0=0
2-5	12	10	22	10	22	0	0	22-22=0	0-0=0	0-0=0
2-6	9	10	19	19	28	0	0	28-19=9	9-0=9	9-0=9
3-7	12	15	27	21	33	6	0	33-27=6	6-0=6	6-6=0
4-5	15	6	21	7	22	1	0	22-21=1	1-0=1	1-1=0
5-6	6	22	28	22	28	0	0	28-28=0	0-0=0	0-0=0
6-7	5	28	33	28	33	0	0	33-33=0	0-0=0	0-0=0
6-8	4	28	32	36	40	0	0	40-32=8	8-0=8	8-0=8
7-8	7	33	40	33	40	0	0	33-33=0	0-0=0	0-0=0

(iii) Critical Path is 1 → 2 → 5 → 6 → 7 → 8

And project duration is $10 + 12 + 6 + 5 + 7 = 40$ days

(iv) Total Float, Free Float and Independent Float has been shown in the table at (ii).

Note:

- EST of the activity of the EST of node at the start of activity.
- EFT of activity is the EST of the activity plus time duration of the activity.
- LFT of the activity is the LFT of the node at the end of the activity.
- LST of the activity is difference between LFT of the activity minus time duration of the activity.
- Total Float (TF) is the difference between:
 - (LFT - EFT) of the activity or
 - (LST - EST) of the activity
- Free Float = Total Float - Slack of event at end of the activity
- Independent Float = Free Float - Slack of the event at start of the activity

(b) Business situations where Pareto Analysis is useful

(i) **Pricing of a product:** In the case of a firm dealing with multi products, it would not be possible for it to analyse cost-profit- price-volume relationships for all of them. In practice, in case of such a firm, approximately 20% of products may account for about 80% of total sales revenue. Such analysis helps the top management to delegate the pricing decision for approximately 80% of its products to the lower levels of management, thus freeing them to concentrate on the pricing decisions for products approximately 20% which are essential for the company's survival.

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- (ii) **ABC analysis- Stock Control:** Another application of Pareto Analysis is in stock control where it may be found that only a few of the goods in stock make up most of the value. In practice approximately 20% of the total quantity of stock may account for about 80% of its value. The outcome of such analysis is that by concentrating on small proportion of stock items that jointly accounts for 80% of the total value, a firm may, well, be able to control most of the monetary investment in stocks.

7. (a) A Departmental head has four subordinates and four tasks to be performed. The subordinates differ in efficiency, and the tasks differ in their intrinsic difficulty. His estimate, of the time each man would take to perform each task, is given in the matrix below:

Tasks	Men				Hour
	E	F	G	H	
A	18	26	17	11	
B	13	28	14	26	
C	38	19	18	15	
D	19	26	24	10	

How should the tasks be allocated to a man, so as to minimize the total man-hours?

- (i) Calculate total man hours required to complete all the tasks as per assignment. 8+2
- (b) The following is the pattern for demand of cars rented out by a tourist operator observed for 100 days:

No. of cars	5	7	10	15
No. of days	20	30	40	10

The random numbers are 88, 76, 10, 05, 23

Required: Simulate the demand for cars over five days.

6

Answer:

- (a) Subtracting the smallest elements of each row from every element of the corresponding row, we get the reduced matrix:

Tasks	Men			
	E	F	G	H
A	7	15	6	0
B	0	15	1	13
C	23	4	3	0
D	9	16	14	0

Subtracting the smallest element of each column of the reduced matrix from every element of the corresponding column, we get the following reduce matrix

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7	11	5	0
0	11	0	13
23	0	2	0
9	12	13	0

Three lines are required to cover all zeros, whereas the order of the matrix is 4. Therefore, optimum assignment cannot be made at this stage. The minimum uncovered element is 5. Therefore, subtracting this element from all the uncovered elements and adding the same to all the elements lying at the intersections of the lines, we obtain the following reduced matrix:

2	6	0	0
0	11	0	18
23	0	2	5
4	7	8	0

Four lines are required to cover all zeros and order of the matrix is also 4. Therefore, Optimum assignment can be made at this stage as follows.

2	6	0	0
0	11	0	18
23	0	2	5
4	7	8	0

Now, each row and each column has one and only one assignment. Therefore, optimal solution is reached.

Optimum assignment is as follows:

A → G , B → E , C → F and D → H

The minimum total time for the assignment schedule is as follows:

Tasks	Men	Man-hours
A	G	17
B	E	13
C	F	19
D	H	<u>10</u>

Total man – hours = 59

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(b)

No. of cars	No. of Days	Probability	Cumulative Prob	Random No. Interval
5	20	0.20	0.20	00-19
7	30	0.30	0.50	20-49
10	40	0.40	0.90	50-89
15	10	0.10	1.00	90-99

Day	Random No.	Demand
1	88	10
2	76	10
3	10	5
4	05	5
5	23	7

Demand for 5 days will be for 10, 10, 5, 5 & 7 Cars respectively.

8. Write Short Notes on any four:

4×4 = 16

- (a) Value Analysis
- (b) Cost Reduction
- (c) Transfer Pricing
- (d) Sunk Cost
- (e) Target Costing

Answer:

(a) Value Analysis

Value Analysis (VA) is one of the important techniques of cost reduction and control. It is a scientific approach that ensures all the functions of a product or service are carried out at the minimum cost without compromising quality, reliability, performance and appearance.

Value Analysis may consist of the following seven phases.

- (i) Origination
- (ii) Information
- (iii) Functional Analysis
- (iv) Innovation
- (v) Evaluation
- (vi) Choice
- (vii) Implementation

The core advantage of using value analysis is its potential for reducing costs, which is a benefit that permeates all advantages of the system. Because of the fact that value analysis breaks down a product or service into components, it enables the analysis of each of the components on its own, evaluating its importance and efficiency.

(b) Cost Reduction

The term 'Cost Reduction' refers to the attempts to reduce the costs. Cost reduction may be defined as the real and permanent reduction in the unit costs of goods manufactured or services rendered without impairing their suitability for the use intended. Cost reduction would mean maximization of profits by reducing cost through economics and savings in costs of manufacture, administration, selling and distribution.

The goal of cost reduction can be achieved either by reducing the cost per unit or by increasing the productivity or doing both at the same time. Reducing wastages, improving efficiency, searching for alternative materials, and a constant drive to reduce costs, can lead to cost reduction.

A research study by PWC puts forward the following five steps for strategic cost reduction to ensure that the business can sustain competitive relevance and maximise its potential.

1. Start with strategy: Have a clear view of cost reduction strategy and ensure it is consistently understood across the organisation.
2. Align costs to strategy: Look across the whole organisation and differentiate the strategically-critical 'good costs' from the non-essential 'bad costs'.
3. Aim high: Be bold, be brave and be creative – use technology, innovation and new ways of working to radically optimise the cost base.
4. Set direction and show leadership: Deliver cost optimisation as a strategic, business transformation program.
5. Create a culture of cost optimisation: Ensure that a culture of ownership is embedded and continuous improvement is incentivised.

There are several tools and techniques that are adopted in achieving cost reduction. Some of the vital ones which are normally used are listed below.

- (i) Value Analysis
- (ii) Simplification & Standardisation
- (iii) Business Process Re-engineering.
- (iv) Benchmarking
- (v) Financial Restructuring
- (vi) Work Study
- (vii) Job Evaluation
- (viii) Quality Control
- (ix) Inventory Control
- (x) Credit Control

(c) Transfer Pricing:

Transfer price is the price that one segment (sub unit, department, division etc..) of an organization charges for a product or services supplied to another segment of the same organization. Transfer prices are used when individual entities of a larger multi entity firm are treated and measured as separately run entities.

The benefits of Transfer Pricing Policy are as under:

- (i) Divisional performance evaluation is made easier.
- (ii) It will develop healthy inter-divisional competitive spirit.
- (iii) Management by exception is possible.
- (iv) It helps in co-ordination of divisional objectives in achieving organizational goals.
- (v) It provides useful information to the top management in making policy decisions like expansion, sub-contracting, closing down of a division, make or buy decisions, etc,
- (vi) Transfer Price will act as a check on supplier's prices.
- (vii) It fosters economic entity and free enterprise system.
- (viii) It optimizes the allocation of company's financial resources based on the relative performance of various profit centres, which in turn, are influenced by transfer pricing policies.

(d) Sunk Costs

Sunk costs are costs that were incurred in the past. Sometimes, accountants use the term "sunk costs" to encompass committed costs as well. Committed costs are costs that will occur in the future, but that cannot be changed. Practically speaking, sunk costs and committed costs are not relevant with respect to any decision, because they cannot be changed. Experiments have been conducted that identify situations in which individuals, including professional managers, incorporate sunk costs in their decisions. One common example from business is that a manager will often continue to support a project that the manager initiated, long after any objective examination of the project seems to indicate that the best course of action is to abandon it. A possible explanation for why managers exhibit this behaviour is that there may be negative repercussions to poor decisions, and the manager might prefer to attempt to make the project *look* successful, than to admit to a mistake.

(e) Target Costing

Target Costing is considered as a philosophy in which product development is based on what the customer wants and is willing to pay for and not what it costs to produce. Hence it starts with the market determined price; then deducts the desired profit margin; and works back the target cost. Peter Drucker calls this "price-led costing." And that is how the formulation:

"Target Cost = Target Price – Target Profit" in place of the traditional approach of "Cost + Profit = Selling Price".

The stages in the process of target costing may be summarised as:

1. Selling Price
2. Target Profit
3. Target Cost
4. Cost Comparison
5. Iteration
6. Launching the Product
7. Product Cost Management
8. Consumption Cost Management

The distinct features of target costing may be stated as:

1. Price-Led Costing
2. Focus on Customers
3. Focus on Design
4. A Multidisciplinary Process
5. An Iterative Process
6. Life Cycle Orientation
7. Extended Enterprise

For process businesses, the focus of target costing shifts from the product to the process, and for service businesses the focus is the service delivery system.

