Answer to MTP_Final_Syllabus 2008_Jun2014_Set 2

Paper- 15: MANAGEMENT ACCOUNTING-ENTERPRISE PERFORMANCE MANAGEMENT

Time Allowed: 3 Hours **Full Marks: 100**

The figures in the margin on the right side indicate full marks.
Attempt Question No. 1 (carrying 25 marks), which is compulsory and
Any five questions (each carrying 15 marks) from the rest.

1. (a) Expand the following abbreviations: **[1×5=5]**

(i) CPOF
(ii) FAST
(iii) RIMS
(iv) OSHAS
(v) FMEA

Answer:

(i) CPOF — Capacity Planning Using Overall Factors
(ii) FAST — Function Analysis System Technique
(iii) RIMS — Risk and Insurance Management Society
(iv) OSHAS — Occupational Safety and Hazard System
(v) FMEA — Failure Mode and Effects Analysis

(b) Define the following terms in not more than two or three lines: **[1×5=5]**
(i) Chase Strategy
(ii) Control Chart
(iii) Cost Breakdown Structure
(iv) Master Production Schedule (MPS)
(v) Detector

Answer:

(i) **Chase Strategy:** A Chase Strategy implies matching demand and capacity period by period. This could result in a considerable amount of hiring, firing or laying off of employees; insecure and unhappy employees; increased inventory carrying cost; problems with labour unions and erratic utilization of plant and equipment.

(ii) **Control Chart:** is a quality control tool to maintain a process under statistical control.

(iii) **Cost Breakdown Structure (CBS):** is central to life cycle costing. Its aim is to identify all the relevant cost elements and it must have well defined boundaries to avoid omission or duplication.

(iv) **Master Production Schedule (MPS):** is basically a production schedule for finished goods. It is derived from current orders plus any forecast requirements. MPS is divided into units of time called "brackets". The MPS is also said to be the aggregated plan "disaggregated".

(v) **Detector:** tracks the performance and can be visualized as a scanning system and it feeds on information. In fact the Detector is another name for Management Information System.

(c) Choose the most appropriate one from the stated options and write it down. [5×2=10]

(i) S LTD., has the capacity of production of 80,000 units and presently sells 20,000 units at ₹ 250 each. The demand is sensitive to selling price and it has been observed that with every reduction of ₹ 10 in selling price, the demand is doubled. What should be the target cost at full capacity if profit margin on sale is taken as 20%?

A. ₹ 167.50
B. ₹ 184.00
C. ₹ 145.00
D. None of the above

(ii) A LTD., has developed a new product and just completed the manufacture of first four units of the product. The first unit took 4 hours to manufacture and the first four units together took 10.24 hours to produce. The Learning Curve rate is

A. 83.50%
B. 80.00%
C. 75.50%
D. None of (A), (B) or (C)

(iii) ANKIT LTD., operates Throughput Accounting System. The details of Product A per unit are as under:

Selling Price	**₹ 188**
Material Cost	**₹ 75**
Conversion Cost	**₹ 50**
Time to bottleneck resources	**25 minutes**

The return per hour for Product A is

A. ₹ 271.20
B. ₹ 150.20
C. ₹ 120.30
D. ₹ 90.40

(iv) A company makes and sells a single product. The selling price and marginal revenue equations are:

Selling Price = ₹ 50 – ₹ 0.001X
Marginal Revenue = ₹ 50 – ₹ 0.002X
Where X is the product the company makes. The variable costs amount to ₹ 20 per unit and the fixed costs are ₹ 1,00,000.
In order to maximize the profit, the selling price should be

A. ₹ 25
B. ₹ 30
C. ₹ 35
D. ₹ 40

(v) A company has budgeted break-even sales revenue of ₹ 12,00,000 and fixed costs of ₹ 4,80,000 for the next period. The sales revenue needed to achieve a profit of ₹ 75,000 in the period will be

A. ₹ 18,50,000
B. ₹ 13,87,000
C. ₹ 11,20,000

D. ₹ 12,00,000

Answer:

(i) B: ₹ 184.

Demand	Price (₹)
20,000	250
40,000	240
80,000	230

Target Cost = ₹ 230 – (230 × 0.20) = ₹ 184

(ii) B = 80%.
Let the learning rate be X.
Since the first unit took 4 hours, average time for the first two units = 4X and
The average time for the first 4 units = $4X \times X = 4X^2$
$\therefore 10.24 \div 4 = 2.56$
$\therefore 4X^2 = 2.56$
Or, $x^2 = 2.56 \div 4 = 0.64$
Or $x = \sqrt{0.64} = 0.80$ i.e. 80%

(iii) A: ₹ 271.20.
(Selling Price – Material Cost) / Time on bottleneck resources.
= [(₹ 188 – ₹ 75)/ 25 minutes] × 60 = ₹ 271.20

(iv) C = ₹ 35.
Selling price = ₹ 50 – ₹ 0.001X
Marginal Revenue = ₹ 50 – ₹ 0.002X
Variable Cost per unit = Marginal Cost per unit = ₹ 20
Optimal output for maximum profit: 20 = 50 – 0.002X,
Hence, X = 30/0.002 = 15,000 units
SP = 50 – 0.001X = 50 – 0.001(15000) = 50 – 15 = ₹ 35.

(v) B = ₹ 13,87,500.
P/V Ratio = Fixed cost/ BE Sales = 4,80,000/ 12,00,000 × 100 = 40%
Contribution required = FC + Profit = ₹ (4,80,000 + 75,000) = ₹ 5,55,000.
Sales = ₹ 5,55,000 / 40% = ₹ 13,87,500

(d) State whether the following statements given below are 'True' or 'False'. If True, simply rewrite the given statement (1 mark). If False, state it as False (½ mark) and rewrite the correct statement (½ mark): [1x5=5]

(i) Value Chain Concept and Value Added Concepts are fundamentally same.
(ii) Value Analysis Process is a less important tool than Function Analysis System Technique.
(iii) Effector is another name for Management Information System.
(iv) JIT manufacturing based on 'Push Through Philosophy', helps to provide the right parts at the right time and in right quantity.
(v) A company's approach to make or buy decision depends on whether the company is operating at or below normal volumes.

Answer:

(i) False. Value Chain concept is fundamentally different from the Value Added Concept.

(ii) **True.** Value Analysis (VA) Process is less important tool than Function Analysis System Technique (FAST)

(iii) **False.** "Detector" is another name for Management Information System (MIS).

(iv) **False.** JIT manufacturing operates as a demand-pull system, producing on demand i.e., making to order.

(v) **False.** A company's approach to make or buy decision involves an analysis of avoidable costs.

2. (a) What is Linear Decision Rule? **[3]**

Answer:

Linear decision rule is an optimizing technique. It seeks to minimize total production costs (labor, overtime, hiring/lay off, inventory carrying cost) using a set of cost-approximating functions (three of which are quadratic) to obtain a single quadratic equation. Then, by using calculus, two linear equations can be derived from the quadratic equation, one to be used to plan the output for each period and the other for planning the workforce for each period.

(b) DB Ltd. operates a conventional stock control system based on re-order levels and Economic Ordering Quantities. The various control levels were set originally based on estimates which did not allow for any uncertainty and this has caused difficulties because, in practice, lead times, demands and other factors do vary.

As part of a review of the system, a typical stock item, Part No. X206, has been studied in detail as follows :

Data for Part No. X206

Lead times.	**Probability**
15 working days	**0.2**
20 working days	**0.5**
25 working days	**0.3**

Demand per working day	**Probability**
5,000 units	**0.5**
7,000 units	**0.5**

Note: It can be assumed that the demands would apply for the whole of the appropriate lead time.

DB Ltd. works for 240 days per year and it costs ₹ 0.15 p.a. to carry a unit of X 206 in stock. The re-order level for this part is currently 1,50,000 units and the re-order cost is ₹ 1,000.

You are required :

(i) To calculate the level of buffer stock implicit in a re-order level of 1,50,000 units.

(ii) To calculate the probability of a stock-out

(iii) To calculate the expected annual stock-outs in units;

(iv) To calculate the stock out cost per unit at which it would be worth while raising the re-order level to 1,75,000 units. **[8]**

Answer:

(i)Buffer stock level

Expected value = lead time × total demand in lead time × joint probability

15 × 5,000 × 0.2 × 0.5 = 7,500
15 × 7,000 × 0.2 × 0.5 = 10,500
20 × 5,000 × 0.5 × 0.5 = 25,000
20 × 7,000 × 0.5 × 0.5 = 35,000
25 × 5,000 × 0.3 × 0.5 = 18,750
25 × 7,000 × 0.3 × 0.5 = 26,250
1,23,000

Expected value of demand in lead time = 1,23,000

Buffer stock = 1,50,000-1,23,000 = 27,000 units

(ii) Stock out(shortage) = p>1,50,000 = 0.15 joint probability at 1,75,000 units

(iii) $EOQ = \sqrt{\frac{2 \times 6,000 \times 240 \times 1,000}{0.15}} = 1,38,564$ units

Demand per working day = (5,000 × 0.5) + (7,000 × 0.5) = 6,000 units

Orders per annum = $\frac{(6,000 \times 240)}{1,38,564} = 10.39$ (on an average)

Expected stock out per annum = (1,75,000-1,50,000) × 0.15 × 10.39 = 38,962 units

(iv) At 1,50,000 reorder level, stock out is 38,962 units

At 1,75,000 reorder level, stock out is nil

Additional cost is 25,000 × 0.15 = ₹3,750

Additional cost per unit = $\frac{₹3,750}{38,962} = ₹ 0.96$.

(c) What are the limitations of Linear Programming Technique? [4]

Answer:

The limitations of Linear Programming (LP) technique are as follows:

- The estimation of the parameter. In all practical situations there are likely to be substantial problems involved in estimating the values to use as the total constraints. Furthermore, the final estimates used are likely to be subject to considerable uncertainty. It is possible to study the effects of uncertainty using sensitivity analysis.
- There is an assumption of linearity. In practice, this assumption may be totally invalid over small ranges. For example, in a profit maximization problem, it may well be found that there are substantial changes in unit variable costs arising from increasing or decreasing returns to scale.
- The linear programming model is essentially static and is, therefore, not really suitable for analyzing in detail the effects of changes in the various parameters, for example over time.

- In some circumstances, a practical solution derived from a linear programming model may be of limited use as, for example, where the variables may only take on integer values. A solution must then be found by a combination of rounding up and trial and error.

3. (a) What are the characteristics and Principles of Business Re-engineering Process? [5]

Answer:

Following are the characteristics of Business Re-engineering Process:

i. Several jobs are combined into one
ii. Often workers make decisions
iii. The steps in the process are performed in a logical order
iv. Work is performed, where it makes most sense
v. Quality is built in
vi. Manager provides a single point of contact
vii. Centralized and decentralized operations are combined.

Seven Principles of Business Re-engineering Process:

a) Processes should be designed to achieve a desired outcome rather than focusing on existing tasks.
b) Personnel who use the output from a process should perform the process
c) Information processing should be included in the work, which produces the information
d) Geographically dispersed resources should be treated, as if they are centralized
e) Parallel activities should be linked rather than integrated.
f) Doers should be allowed to be self-managing
g) Information should be captured once at source.

(b) In a textile sales emporium, four salesmen A,B,C and D are available to four counters W,X,Y and Z. Each salesman can handle any counter. The service (in hour) of each counter when manned by each salesman is given below:

	Salesman			
Counter	**A**	**B**	**C**	**D**
W	**41**	**72**	**39**	**52**
X	**22**	**29**	**49**	**65**
Y	**27**	**39**	**60**	**51**
Z	**45**	**50**	**48**	**52**

How should the salesmen be allocated appropriate counters so as to minimum the service time? Each salesman must handle one counter. [10]

Answer:

Step 1. Row subtraction

salesman / counter	A	B	C	D

W	2	33	0	13
X	0	7	27	43
Y	0	12	33	24
Z	0	5	3	7

Column subtraction

salesman / counter	**A**	**B**	**C**	**D**
W	2	28	0	6
X	0	2	27	36
Y	0	7	33	17
Z	0	0	3	7

Step 2. Minimum straight lines to cover zeros

salesman / counter	**A**	**B**	**C**	**D**
W	~~2~~	~~28~~	~~0~~	~~6~~
X	0	2	27	36
Y	0	7	33	17
Z	~~0~~	~~0~~	~~3~~	~~7~~

Step 3. Smallest uncovered number subtracted from uncovered numbers, added to numbers at intersection of two lines

salesman / counter	**A**	**B**	**C**	**D**
W	~~4~~	~~28~~	~~0~~	~~6~~
X	~~0~~	~~0~~	~~25~~	~~34~~
Y	~~0~~	~~5~~	~~31~~	~~15~~

Z	~~2~~	0	~~3~~	0

Step 4. Return to step 2. Cover all zeros. Since the number of lines is 4, the optimality criteria is satisfied.

counter \ salesman	**A**	**B**	**C**	**D**
W	4	28	**0**	6
X	0	**0**	25	34
Y	**0**	5	31	15
Z	2	0	3	**0**

Step 5. Assign

Counter	Salesmen	Time (hours)
W	C	39
X	B	29
Y	A	27
Z	D	52
Total		147

4. (a) The directors of ABC Ltd. manufactures three products A,B and C, have asked for advice on the product mix of the company. The following information is given:

		Products		
Particulars		**A**	**B**	**C**
Standard cost per unit:				
Direct material		**20**	**60**	**40**
Variable overhead		**6**	**4**	**10**
Direct labour:				
Department	**Rate/ Hr.**	**Hrs.**	**Hrs.**	**Hrs.**
1	**₹ 1**	**28**	**16**	**30**
2	**₹ 2**	**5**	**6**	**10**
3	**₹ 1**	**16**	**8**	**30**
Current production p.a.		**10,000**	**5,000**	**6,000**
Selling price per unit (₹)		**100**	**136**	**180**
Forecast of sales for next year		**12,000**	**7,000**	**9,000**

Fixed overheads p.a. ₹ 4,00,000.

Further, the type of labour required by Dept. 2 is in short supply and it is not possible to increase the manpower of this department beyond its present level.

A. You are required to prepare a statement showing the most profitable mix of the products to be made and sold. The statement which should be presented in two parts should show :

(i) the profit expected on current budgeted production; and

(ii) the profit which could be expected if the most profitable mix was produced.

B. You are also required to bring out any problems which are likely to arise if the product mix in A. (ii) above were to be adopted. [9]

Answer:

A. (i) Statement showing profit on current budgeted production

Products	**A**	**B**	**C**	**Total**
Units	10,000	5,000	6,000	
Sales (₹) (i)	10,00,000	6,80,000	10,80,000	27,60,000
Direct material	2,00,000	3,00,000	2,40,000	7,40,000
Direct wages :				
Dept 1	2,80,000	80,000	1,80,000	5,40,000
2	1,00,000	60,000	1,20,000	2,80,000
3	1,60,000	40,000	1,80,000	3,80,000
Variable overhead	60,000	20,000	60,000	1,40,000
Marginal cost (ii)	8,00,000	5,00,000	7,80,000	20,80,000
Contribution (i) - (ii)	2,00,000	1,80,000	3,00,000	6,80,000
Fixed overhead				4,00,000
Net profit				2,80,000

Particulars	A	B	C
Marginal cost (per unit)	80	100	130
Contribution (per unit)	20	36	50
Contribution (per hour of Dept 2)	4	6	5
Ranking	III	I	II

Since the key factor is labour hours, production hours should be applied for the products in the order B, C and A, as ranked above.

Total hours available in Dept. 2 on the basis of current production

A	(10,000 x 5)	50,000

B	(5,000 x 6)	30,000
C	(6,000 x 10)	60,000
Total hours		1,40,000

Reallocation on Hrs. available in Dept. 2

Product	Units	Hrs. per unit	Total hours
B	7,000	6	42,000
C	9,000	10	90,000
A	1,600	5	8,000*
			1,40,000

'balancing figure

A. (ii) Statement of profit as per revised programme

₹

Product	A	B	C	**Total**
Units	1,600	7,000	9,000	
Sales	1,60,000	9,52,000	16,20,000	27,32,000
Marginal costs	1,28,000	7,00,000	11,70,000	19,98,000
Contribution	32,000	2,52,000	4,50,000	7,34,000
Fixed cost				4,00,000
Net profit				3,34,000

B. The following possible problems should be guarded against, before taking the above decision :

(i) The demand for product A may be complementary to demand for the other products. If it is so, sales of B and C may fall with fall in demand of product A.

(ii) Lower production of product A may adversely affect customers' preferences for other products.

(b) What is MRP II and what are the essential elements of it? [6]

Answer :

Manufacturing Resource Planning (MRP II) is a computer based system designed to manage all the resources of a manufacturing organization. It acts as a planning and scheduling system, linking manufacturing with the sales and finance departments and providing tools for joint decision making among all three departments.

The essential elements of MRP II system are as follows :

- Demand forecast : Which takes into account firm orders and sales forecasts.
- Production planning : Which converts the demand forecast into a broad statement of output requirements and the necessary production programme.

- Resource planning : Which determines the manufacturing resources (materials and bought-in-components etc.) required to meet the production programme.
- Rough-cut capacity planning : Which is used to test the feasibility of meeting the production programme, taking into account the capacity available.
- Master production schedule : Which is prepared on the basis of the information obtained from the demand forecasting, production planning, resource planning and rough-cut capacity planning processes.
- Bills of materials : Which maintain the basic data for defining product i.e., lists of the components and material required to produce an end product or assembly.
- Materials requirement planning : Which determines component and material requirements on the basis of information from the master production schedules and the purchasing and inventory control function.
- Detailed material and capacity plans : Which set out the detailed schedules for providing material and capacity as derived from the material requirement plans and detailed capacity planning – only if capacity is available is the plan allowed to proceed.
- Shop and purchase order release : Which activate production and purchasing.
- Shop-floor control : Which monitors production against the plan and feeds back which enables the master production schedule and capacity and material plans to be updated.
- Purchase and Inventory control : Which monitors purchasing against the material plans and feeds back to the master production schedules and materials plans to enable updating to take place as required. Inventory control are also maintained on the basis of shop-floor usage.

5. (a) O.B.C Ltd. is evaluating its Research and Development programme for the year 2012. The five projects under consideration all appear to offer favourable profitability if they can be carried out successfully to completion. But ₹ 10 lakhs only has been provided against R&D in the Budget for 2012.

The following information is relevant :

Expenditure (₹ Lakhs)			Probability of success	
Project	To date	To complete	Commercially	Technically
1	15	1	0.7	0.4
2	12	3	0.8	0.5
3	11	3	0.5	0.9
4	6	7	0.4	0.5
5	4	10	0.3	0.9

Which Projects should be completed in 2012 and why? [5]

Answer:

It is given that only ₹ 10 lakhs are available for carrying out R&D programme by five project. Only those projects should be completed which offer high probability of success. It is noticed that O.B.C Ltd. has already incurred expenditure to date. This being sunk cost is irrelevant for decision making purpose. However, expenditure required to complete the project and joint

probability (commercial probability of success x technical probability of success) are relevant for this decision.

Project	joint probability of success ₹/lakhs)	1 Expenditure to complete for success	Weighted expenditure (2) × (3)
(1)	(2)	(3)	(4)
1	0.28	1	0.28
2	0.40	3	1.20
3	0.45	3	1.35
4	0.20	7	1.40
5	0.27	10	2.70

Projects 5 required ₹ 10 lakhs to complete but the weightage for success is 2.70 only. If projects 3 and 4 are completed, the weightage of success is 2.75 i.e. 1.35 + 1.40. Therefore, projects 3 and 4 should be completed in the year 2012.

(b) Following are the data collected in running a machine, the cost of which is ₹60,000 are given below:

Year	1	2	3	4	5
Resale Value	42,000	30,000	20,400	14,400	9,650
Cost of Spares	4,000	4,270	4,880	5,700	6,800
Cost of labour	14,000	16,000	18,000	21,000	25,000

Determine the optimum period for replacement of machine. [5]

Answer:

The operating or maintenance costs of machine in successive years is as follows:

Year	1	2	3	4	5
Operating costs i.e. [Cost of Spares + Cost of Labour]	18,000	20,270	22,880	26,700	31,800

To find the average cost per year of the machine, we prepare the following table:

Year (n)	Operating Cost f(t)	Cummulative operating cost ∑f(t)	Resale value S(t)	Depreciation C-S(t)	Total TC_n	Average cost per year
(1)	(2)	(3)	(4)	(5)	(3+5=6)	(7)
1	18,000	18,000	42,000	18,000	36,000	36,000.00
2	20,270	38,270	30,000	30,000	68,270	34,135.00
3	22,880	61,150	20,400	39,600	1,00,750	33,583.30
4	26,700	87,850	14,400	45,600	1,33,450	33,362.50

5	31,800	1,19,650	9,650	50,350	1,70,000	34,000.00

The above table shows that the average cost is minimum during the fourth year. Hence, the machine should be replaced at the end of four year.

(c) What is Bench Trending and how does it differ from Bench Marking? [5]

Answer:

Bench Trending is continuous monitoring of specific process performance with a selected group of benchmarking is a systematic and continuous measurement process of comparing through measuring an organization business processes against business leaders (role models) anywhere in the world, to gain information that will help organization take action to improve its performance. The continuous process of enlisting the best practices in the world for the processes, goals and objectives leading to world class levels of achievement.
Benchmarking is the process of comparing the cost, time or quality of what one organization does against what another organization does. The result is often a business case for making changes in order to make improvements.
Benchmarking is a powerful management tool because it overcomes "paradigm blindness". Paradigm Blindness can be summed up as the mode of thinking, "the way we do it is the best because this is the way we've always done it". Bench Marking opens organizations to new methods, ideas and tools to improve their effectiveness. It helps crack through resistance to change by demonstrating other methods of solving problems than the one currently employed and demonstrating that they work, because they are being used by others.

(a) Identify your problem areas
(b) Identify other industries that have similar processes
(c) Identify organizations that are leaders in these areas
(d) Survey companies for measures and practices
(e) Visit the "best practice" companies to identify leading edge practices
(f) Implement new and improved business practices.

6. (a) Indo Gulf Fertilizers Ltd. supports the concept of the terotechnology or life cycle costing for new investment decisions covering its engineering activities.

The company is to replace a number of its machines and the Production Manager is to run between the "X" machine, a more expensive machine with a life of 12 years, and the "W" machine with an estimated life of 6 years. If the "W" machine chosen it is likely that it would be replaced at the end of 6 years by another "W" machine. The pattern of maintenance and running costs differs between the two types of machine and relevant data are shown below :

Particulars	X	Y
Paurchase Price	**₹19,000**	**₹13,000**
Trade-in-value	**₹3,000**	**₹3,000**
Annual repair costs	**₹2,000**	**₹2,600**
Overhead costs (in 8th & 4th year respectively)	**₹4,000**	**₹2,000**
Estimated financing costs averaged over machine life (p.a)	**10%**	**10%**

You are required to recommend, with supporting figures, which machine to purchase, stating any assumptions made. [6]

Answer:

Machine X – Life 12 years

	Year	Cost Factor (₹)	Discount Cost (₹)	Discounted
Purchase price	**0**	**19,000**	**1.00**	**19,000**
Overhead cost	**8**	**4,000**	**0.47**	**1,880**
Trade-in-value	**12**	**(3,000)**	**0.32**	**(960)**
Annual repair cost	**1-12**	**2,000**	**6.81**	**13,620**
				33,540
Annualized equivalent = ₹ 33,540/ 6.81 = ₹ 4,925				

Machine Y – Life 6 years

	Year	Cost Factor (₹)	Discount Cost (₹)	Discounted
Purchase price	**0**	**13,000**	**1.00**	**13,000**
Overhead cost	**4**	**2,000**	**0.68**	**1,360**
Trade-in-value	**6**	**(3,000)**	**0.56**	**(1,680)**
Annual repair cost	**1-6**	**2,600**	**4.36**	**11,336**
				24,016
Annualized equivalent = ₹ 24,016/ 4.36 = ₹ 5,508				

Recommendation – Purchase Machine "X"

Assumptions :

(a) Same performance, capacity and speed
(b) No inflation
(c) 12 year-estimates are as accurate as 6-years estimates
(d) Cash flow at the year end.

(b) Write a note on Target Costing. [5]

Answer:

Target costing is defined 'as a cost management tool for reducing the overall cost of a product over its entire life cycle with the help of the production, engineering, R&D.'

The target cost is the estimated cost of a product that enables a company to remain and compete in the market in the long run. The idea of target costing, originally promoted in Japan, is about going upstream to achieve cost reduction. Target costing is not really a method of costing, but it is a technique used in cost management. The intent of target costing is to reduce cost, where reduction is aimed at the entire life cycle of any product. Target costing can also help in achieving certain broader objectives, such as, identifying and delivering various customer requirements in a product through effective management of different processes.

A firm's business plan and product market strategies provide the framework and basic guidelines for applying the target costing methodology. Specific steps involved in target costing may be summarized as follows :

- Determine customer wants precisely.
- Translate them into desired product performance feature.
- Estimate the proportion of value added by each feature and component.
- Choose a product design assures a targeted profit, and cost targets for each component in total.
- Choose manufacturing design that assure targeted costs.
- Choose suppliers that assure buying at targeted costs.
- After each cost review, conduct value engineering to reduce target costs.
- Monitor initial production to be sure that all product performance, cost, profit, targets are met.

(c)What are the objectives of JIT production methods? [4]

Answer:

Just in time (JIT) is a production strategy that strives to improve a business return on investment by reducing in-process inventory and associated carrying costs. The philosophy of JIT is simple: inventory is waste. JIT inventory systems expose hidden cost of keeping inventory, and are therefore not a simple solution for a company to adopt.

The objectives of JIT are as follows :

- Produce only the products the customer wants.
- Produce products only at the rate that the customer wants them.
- Produce with perfect quality.
- Produce with minimum lead time.
- Produce products with only those features the customer wants.
- Produce with no waste of labor, material or equipment — every movement must have a purpose so that there is zero idle inventory.
- Produce with methods that allow for the development of people.

7. (a) What is meant by the term Value Analysis? [3]

Answer:

Value Analysis defines a basic function as anything that makes the products work or sell. A function that is defined as basic control change. Secondary functions, also called supporting functions, described the manner in which basic functions were implemented. Secondary function could be modified or eliminated to reduce product cost.

The term value has four different meanings:

Cost Value, use value, esteem value and exchange value.

The first step in the value analysis process is to define the problem and its scope.

Once this is done, the functions of the product and its items are derived. These functions are basic and secondary functions. A cost function matrix or value analysis matrix is prepared. Improvement opportunities are then brainstormed, analysed and selected.

(b) A Mutual Fund has cash resources of ₹200 million for investment in a diversified portfolio. Table below shows the opportunities available, their estimated annual yields, risk factor and term period details.

Formulate a Linear Program Model to find the optimal portfolio that will maximize return, considering the following policy guidelines :

- **All the funds available may be invested.**
- **Weighted average period of at least five years as planning horizon.**
- **Weighted average risk factor not to exceed 0.20**
- **Investment in real estate and speculative stocks to be not more than 25% of the monies invested in total.**

Investment type	Annual yield (percentage)	Risk factor	Term period (years)
Bank deposit	9.5	0.02	6
Treasury notes	8.5	0.01	4
Corporate deposit	12.0	0.08	3
Blue-chip stock	15.0	0.25	5
Speculative stocks	32.5	0.45	3
Real estate	35.0	0.40	10

[5]

Answer :

Mathematical formulation :

Let x_1, x_2, x_3, x_4, x_5 and x_6 represent the six different investment alternatives, i.e., x_1 is bank deposit, x_2 is treasury note. x_3 corporate deposit, x_4 blue-chip stock, x_5 speculative stock and x_6 real estate. The objective is to maximize the annual yield of the investors (in number of units) given by the Linear expression.

Maximise $Z = 9.5\, x_1 + 8.5\, x_2 + 12.0\, x_3 + 15.0\, x_4 + 32.5\, x_5 + 35.0\, x_6$

Subject to the constraints :

$x_1 + x_2 + x_3 + x_4 + x_5 + x_6 \leq 1$ (Investment decision)

$0.02\, x_1 + 0.01\, x_2 + 0.08\, x_3 + 0.25\, x_4 + 0.45\, x_5 + 0.40\, x_6 \leq 0.20$ [weighted average risk of the portfolio]

$6\, x_1 + 4\, x_2 + 3\, x_3 + 5\, x_4 + 3\, x_5 + 10\, x_6 \leq 5$ [weighted average length of investment]

$x_5 + x_6 \leq 0.25$ [limit on investment in real estate and speculative stock]

$x_1, x_2, x_3, x_4, x_5, x_6 \geq 0$ [non-negativity condition].

(c) P Ltd. has two divisions, S and T, S transfer all its output to T, which finishes to work. Cost and revenues at various levels of capacity are as follows :

Output	S. costs	T Net revenues (i.e., revenue minus costs incurred in T)	Profit
	(Units)	(₹)	(₹)
600	600	2,950	2,350
700	700	3,250	2,550
800	840	3,530	2,690
900	1,000	3,780	2,780
1,000	1,200	4,000	2,800
1,100	1,450	4,200	2,750
1,200	1,800	4,350	2,550

Company profits are maximised at ₹ 2,800 with output of 1,000 units. If P Ltd. wish to select a transfer price in order to establish S and T as profit centres, what transfer price would motivate the managers of S and T together to produce 1,000 units, no more and no less?

P Ltd. wants that the transfer price should be set at ₹ 2.10 per unit. Comment on this proposal.

[7]

Answer:

The transfer price will be notional revenue to S and notional costs to T.

(a) S will continue to produce more output until the costs of further production exceed the transfer price revenue.

(b) T will continue to want to receive more output from S until its net revenue from further processing is not sufficient to cover the incremental transfer price costs.

Out Put (Unit)	Division S Incremental costs (₹)	Division T Incremental cost (₹)
600	-	-
700	100	300
800	140	280
900	160	250
1,000	200	220
1,100	250	200
1,200	350	150

Since S will continue to produce more output if the transfer price exceeds the incremental costs of production, a price of at least ₹200 per units (₹ 2 per unit) is required to 'Persuade' the manager of S to produce as many as 1,000 units, but a price in excess of ₹ 250 per 100 units would motivate the manager of S to produce 1,100 units (or more).

By a similar argument, T will continue to want more output from S if the incremental revenue exceed the transfer costs from S. If T wants 1,000 units the transfer price must be less than ₹220 per 100 units. However, if the transfer price is lower than ₹ 200 per 100 units, t will ask for 1,100 units from S in order to improve its division profit further.

In summary :

(a) The total company profit is maximized at 1,000 units of output.

(b) Division S will, want to produce 1,000 units, no more and no less, if the transfer price is between ₹ 200 and ₹ 250 (i.e. ₹ 2 to ₹ 2.50 per 100 units).

(c) Division T will want to receive and process 1,000 units, no more and no less, if the transfer price is between ₹ 2 and ₹ 2.20

(d) A transfer price must, therefore, be selected in the range ₹ 2.00 to ₹ 2.20 per unit (exclusive).

Thus, if a price of ₹ 2.10 per unit is selected, profits at 1,000 units of output would be :

Particulars	Division S	Division T	Total
Sales/ Net revenue	2,100	4,000	4,000
Costs	1,200	2,100	1,200
Profit	900	1,900	2,800

At a transfer Price of ₹ 2.10, any increase in output above 1,000 units, or shortfall in output below this amount, would reduce the profits of the company as a whole, but also the divisional profits of S and T.

8. Write a short on any three of the following: [5×3=15]
(a) Demand Stimulation
(b) Succession Planning
(c) Query Tools
(d) Mainframes

Answer:

(a) Demand Stimulation :

Options for situations in which demand needs to be increased in order to match capacity include:

Pricing - Varying (lower) pricing to increase demand in periods when demand is less than peak. For example, matinee prices for movie theaters, off-season rates for hotels, night time rates for mobile telephone service, and off-season pricing for items that experience seasonal demand.

Promotion - Advertising, direct marketing, bulk purchase discounts, bonus/free offers and other forms of promotion are used to shift demand.

Back ordering - By postponing delivery on current orders demand is shifted to period when capacity is not fully utilized. This is really just a form of smoothing demand. Service industries are able to smooth demand by taking reservations or by making appointments in an attempt to avoid walk-in customer. Some refer to this as "partitioning" demand.

New demand creation - A new, but complementary demand is created for a product or service. When restaurant customers have to wait, they are frequently diverted into a

complementary (but not complimentary) service, the bar. Other examples include the addition of video arcades within movie theaters, and the expansion of services at convenience stores.

(b) Succession Planning:

Succession Planning (SP) is a critical part of the Human Resources Planning (HRP) process. HRP is the process of having the right number of employees in the right positions in the organization at the time that they are needed. HRP involves forecasting or predicting the organization's needs for labour and supply of labour and then taking steps to more people into positions in which they are needed.

Succession Planning is the systematic process of defining future management requirements and identifying candidates who best meet those requirements. SP involves using the supply of labour within the organization for future staffing needs. With SP, the skills and abilities of current employees are assessed to see which future positions they may take within the organization when other employees leave their positions. SP is typically used in higher-level organizational positions. For instance, if a company predicts that its CEO will retire in the near future, the organization may begin looking months or even years in advance to determine which current employee might be capable of taking over the position of the present retiring CEO. SP is thus aimed at promoting individuals within the organization and thus makes use of internal selection.

Basic Steps in effective SP involves:

- Human resources planning
- Assessing needs
- Developing managers
- Developing replacement charts and
- Identifying individual career growth plan

(c) Query Tools:

Query Tools allow the users to find the information needed to perform any specific function. The inability to easily create and execute functional queries is a common weak link in many information systems. A significant cause of that inability, as noted earlier, can be the communication difficulties between a management information systems department and the system users.

Another critical issue toward ensuring successful navigation of the varied information levels and partitions is the compatibility factor between knowledge bases. For maximum effectiveness, the system administrator should ascertain that the varied collection, retrieval, and analysis levels of the system either operate on a common platform, or can export the data to a common platform. Although much the same as query tools in principle, intelligent agents allow the customization of the information flow through sorting and filtering to suit the individual needs of the users. The primary difference between query tools and intelligent agents is that query tools allow the sorting and filtering processes to be employed to the specifications of management and the system administrators, and intelligent agents allow the information flow to be defined in accord with the needs of the user.

(d) Mainframes

The original computerized information systems were based on mainframes. "Mainframe" is a term originally referring to the cabinet containing the central processor unit or "mainframe" of a room-filling computer. After the emergence of smaller mini-computer designs in the early 1970s, the traditional large machines were described as "mainframe computers," or simply mainframes. The term carries the connotation of a machine designed for batch rather than interactive use, though possibly with an interactive time-sharing operating system retrofitted onto it.

It has been conventional wisdom in most of the business community since the late 1980s that the mainframe architectural tradition is essentially dead, having been swamped by huge advances in integrated circuit design technology and low-cost personal computing. Despite this, mainframe sales in the United States enjoyed somewhat of a resurgence in the 1990s, as prices came down and as large organizations found they needed high-power computing resources more than ever. Supporters claim that mainframes still house 90 percent of the data major businesses rely on for mission-critical applications, attributing this to their superior performance, reliability, scalability, and security compared to microprocessors.