

## Paper 9 - Operations Management and Information Systems

### Section –A

[Question no. 1 is Compulsory and any 4 from the rest]

#### 1 Answer the following questions:

- (a) A work sampling study is to be made of a typist pool. It is felt that typists are idle 30 percent of the item. How many observations should be made in order to have 95.5% confidence that accuracy is within  $\pm 4\%$ .
- (b) A steel plant has a design capacity of 50,000 tons of steel per day, effective capacity of 40,000 tons of steel per day and an actual output of 36,000 tons of steel per day. Compute the efficiency of the plant and its utilization.
- (c) The demand function of a firm is  $q = 200 - 10p$  and the average cost function is  $AC = 10 + \frac{q}{25}$ . If the firm's objective is to maximize profit, what will be its profit maximizing output?
- (d) Consider the pay off matrix given below:

		Player B	
		$B_1$	$B_2$
Player A	$A_1$	$\begin{bmatrix} 2 & 6 \end{bmatrix}$	
	$A_2$	$\begin{bmatrix} -2 & \lambda \end{bmatrix}$	

- (i) Show that whatever be the value of  $\lambda$ , the game is strictly determinate.
- (ii) Determine the value of game
- (e) If a firm sells 8,000 units, its loss is ₹ 20,000. But if it sells 10,000 units, its profit is ₹ 20,000. Calculate Fixed Cost.
- (f) List the name of the Qualitative Approaches regarding the Forecasting Technique. [6x2]
- 2 (a) At Dr. Prachi's clinic patients arrive at an average of 6 patients per hour. The clinic is attended to by Dr. Prachi himself. Some patients require only the required prescription. Some come for minor checkup while some others require through inspection for the diagnosis. This takes the doctor 6 minutes per patient on an average. It can be assumed that arrivals follow a Poisson Distribution and the Doctor's inspection time follows an Exponential Distribution.  
Determine:
- (i) The percentage of time that a patient can walk to the doctor without having to wait;
  - (ii) The average number in the system.
  - (iii) The average number in the queue.
  - (iv) The average waiting time / unit in the system.
- (b) Describe the role of Project Manager. [7+5]

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- 3 (a)** A firm produce three products A, B, and C, each of which passes through three departments: Fabrication, Finishing and Packing. Each unit of Product A requires 3, 4 and 2; each unit of products B requires 5, 4 and 4, while each unit of product C requires 2, 4 and 5 hours respectively in the three departments. Every day, 60 hours are available in the fabrication department, 72 hours in the finishing department and 100 hours in the packing department.

The unit contribution of product A is ₹5, of product B is ₹10, and of product C is ₹8.

Required:

Formulate the problem as an LPP (Not required to Solve)

- (b)** Discuss the Classification of Production Planning and Control Functions (PPC). [5+7]

- 4(a)** A firm produces four products. There are four operators who are capable of producing any of these four products. The firm records 8 hours a day and allows 30 minutes for lunch. The processing time in minutes and the profit for each of the products are given below:

Operator	Products			
	A	B	C	D
1	15	9	10	6
2	10	6	9	6
3	25	15	15	9
4	15	9	10	10
Profit (₹) per unit	8	6	5	4

Find the optimal assignment of products to operators.

- (b)** Mention the characteristics of Just – in – Time system. [10+2]

- 5 (a)** The number of breakdowns of equipment over the past 2 years below:

No. of Break downs	No. of month this occurred
0	3
1	7
2	9
3	3
4	2
Total	24

Each break down costs an average of ₹ 300. Preventive maintenance service can be hired at a cost of ₹ 150 per month and it will limit the breakdowns to an average of one per month. Which maintenance arrangement is preferable, the current break down maintenance policy or a preventive maintenance service contract?

- (b)** Discuss the advantages of Network Scheduling. [9+3]

- 6 (a)** Discuss the characteristics of Good Product Design.

- (b)** Briefly explain about Designing for Manufacture and Assembly (DFMA). [9+3]

## Section – B

**Question No. 7 is compulsory and any 4 from the rest**

7. (a) What is Operation Manuals in relation to a system? [4×2]  
(b) What is meant by “key pair” in the context of Asymmetric Crypto System?  
(c) What is Program Debugging?  
(d) State the duties and responsibilities of an Information System Manager?
8. (a) State the major characteristics of Transaction Processing System. [6]  
(b) List the functions of a Steering Committee involved in a System Development Life Cycle. [2]
9. List the advantages of E – commerce. [8]
10. (a) List and describe the contents of a System Manual. [6]  
(b) State how a Structure Chart differs from a Flow Chart. [2]
11. (a) Discuss the important characteristics of a good Management Information System (MIS). [5]  
(b) What is meant by the term Non-Programmed Decision making? [3]
12. (a) State the benefits of Electronic Data Interchange. [3]  
(b) List the major features of Enterprise Resource Planning. [5]