



Printed Pages : 7

TAS - 601

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3090

Roll No.

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B. TECH.

(SEM. VI) EXAMINATION, 2006-07

INDUSTRIAL MANAGEMENT

Time : 3 Hours]

[Total Marks : 100

- Note :*
- (i) Attempt all questions.*
 - (ii) All questions carry equal marks.*

1 Attempt any **four** of the following : **5×4=20**

- (a) What are essential features of operations research? Mention different phases in an operations research study.
- (b) In relation to linear programming, explain the implications of the following assumptions of the model :
 - i. Linearity of objective function and constraint
 - ii. Continuous variable
 - iii. Certainty
- (c) An advertising agency wishes to reach two types of audiences; customers with annual income of more than Rs.15000 (target audience A) and customers with annual income of less

than Rs.15000/- (target audience B). The total advertising budget is Rs.2,00,000. One programme of TV advertising costs Rs.50,000 and one programme of radio advertising costs Rs.20,000. For contract reasons, at least 3 programmes have to be on TV and the number of radio programme must be limited to 5. Surveys indicate that a single TV programme reaches 4,50,000 customers in target audience A and 50,000 in the target audience B. One radio programme reaches 20,000 in target audience A and 80,000 in target audience B. Formulate the above as linear programming problem.

- (d) Sandow Ltd. has two products, Rose & Lotus. To produce one unit of Rose, 2 units of material X and 4 units of material Y are required. To produce one unit of lotus, 3 units of material X and 2 units of material Y are required. At last 16 units of each material must be used in order to meet the committed sales of rose and lotus cost per unit of material X and material Y are Rs.2.50 per unit and Rs.0.25 per unit respectively. You are required to find out the minimum cost graphically.
- (e) Mention the difference between a feasible solution, a basic feasible solution and an optimal solution of a linear programming problem.
- (f) What is a redundant constraint? What does it imply? Does it affect the optimal solution to an LPP?

2 Attempt any **four** of the following: 5×4=20

- (a) Use simplex method to solve the following LP Problem :

$$\text{Maximise } Z = 3x_1 + 4x_2 + x_3$$

$$\text{S.T } x_1 + 2x_2 + 3x_3 \leq 90$$

$$2x_1 + x_2 + x_3 \leq 60$$

$$3x_1 + x_2 + 2x_3 \leq 80$$

$$x_1, x_2, x_3 \geq 0$$

- (b) What is degeneracy? What are its practical impacts on LP solution? With the help of the following numerical example, explain the same.

$$\text{Max } Z = 3x_1 + 9x_2$$

$$\text{S.T } x_1 + 4x_2 \leq 8$$

$$x_1 + 2x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

- (c) Build the mathematical model for the following transportation problem:

(The objective is to minimize the costs involved in transporting goods from factory to warehouses)

Cost Matrix

	W_1	W_2	W_3	W_4	Supply
F_1	1	2	4	4	6
F_2	4	3	2	0	8
F_3	0	2	2	1	10
Demand	4	5	8	6	

(Cell entries indicate unit costs $F_1 \rightarrow$ Factory, $W_1 \rightarrow$ Warehouse)

- (d) How would you deal with the assignment problems, where
- (i) Some assignments are prohibited.
 - (ii) The objective functions is of maximization type.
- (e) Compare between PERT and CPM. Distinguish between total float, free float and independence float.
- (f) A project consists of eight activities with the following time estimates.

Activity	Immediate Predecessor	Time (days)		Pessimistic
		Optimistic	Most likely	
A	—	1	1	7
B	—	1	4	7
C	—	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D & E	3	6	15
H	F & G	1	2	3

- (i) Draw a PERT network with the above information
- (ii) Determine the critical path.

3 Answer any **two** of the following :

10×2=20

- (a) State the assumptions underlying game theory. Discuss its importance in business applications. Explain in brief, the terms (i) saddle point, (ii) pure strategy and (iii) mixed strategy.
- (b) Reduce the following two person zero sum game to (2×2) order and obtain the optimal strategies for each player and the value of the game.

		<i>Player B</i>			
		B ₁	B ₂	B ₃	B ₄
Player A	A ₁	3	2	4	0
	A ₂	3	4	2	4
	A ₃	4	2	4	0
	A ₄	0	4	0	8

- (c) What do you understand by queuing structure? Explain (i) First come first served (ii) Last come first served and (iii) Service-in-random-order basis of customer handling.

4 Answer any **two** of the following :

10×2=20

- (a) What do you understand by patents and intellectual propriety rights? Describe briefly with reference to India's position as on today.

- (b) A TV repairman finds that the time spent on his job has an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they come and if the arrival of sets is approx. poisson with an average rate of 10 per 8-hour day, what is his expected idle time each day? How many jobs are ahead of the set just brought in?
- (c) Explain how we can use the transportation algorithm for scheduling of production in a manufacturing organization whose product is subject to seasonal variation. In what way is a transshipment problem different from a transportation problem?

5 Answer any **four** of the following : **5×4=20**

- (a) Briefly trace the historical development of engineering management.
- (b) With the increasing complexity of technology, its management has become extremely complex. Discuss with the help of a real life example.
- (c) What type of organization structure will be suitable for a capital intensive technology so that the people can give in their best? Explain with the help of an example.
- (d) "Managing a project involves uncertainty, complexity and non-routine jobs". Illustrate with reference to managing a traditional form of organization.

- (e) Briefly explain the benefits of project organization over other forms of organization for managing a project with the help of an example.
 - (f) How is today's project management practices influenced by the rapid technological development? Briefly explain.
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