

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MBA – SEMESTER -III– EXAMINATION – WINTER 2021**

Subject Code: 4539271

Date: 21-02-2022

Subject Name: Operations Research

Time: 10:30 AM TO 01:30 PM

Total Marks: 70

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q. No.	Question Text and Description	Marks
Q.1	Definitions / terms / explanations / short questions based on concepts of theory/practical (a) Saddle point (b) Degeneracy (c) Goal programming (GP) (d) Feasible solution (e) Big M (f) Monte Carlo Simulation (g) LPP	14
Q.2	(a) What are the essential characteristics of operations research? Mention different phases in an operation research study. Point out its limitation. If any.	07
	(b) 'Linear programming has no real – life applications'. Do you agree with this statement? Discuss.	07
	<b>OR</b>	
	(b) Discuss and describe the role of linear programming in managerial discussion-making bringing out limitations, if any.	07
Q.3	(a) What is simplex? Describe the simple method of solving linear programming problem.	07
	(b) Queuing theory can be used effectively in determining optimal service levels. Elucidate this statement with the help of an example.	07
	<b>OR</b>	
Q.3	(a) Give two examples to illustrate the applications of queuing theory in business and industry.	07
	(b) "The Markov analysis may be understood as the way of analyzing the past and present movement of some variable in an effort to forecast the future movement of the same variable." Explain this statement with the help of a suitable example from marketing and personnel.	07
Q.4	(a) 'Linear programming is one of the most frequently and successfully applied operations research technique to managerial decisions.' Elucidates this statement with some examples.	07
	(b) 'When it becomes difficult to use an optimization technique for solving a problem, one has to resort to simulation technique.' Discuss	07

**OR**

Q.4 (a) What is a game in game theory? What are the properties of a game? Explain the 'best strategy' on the basis of minimax criterion of optimality. 07

(b) 07

Q.5

**CASE STUDY:**

Xyz tobacco company purchases tobacco and stores in warehouses located in the following four cities:

Warehouse Location (City)	A	B	C	D
Capacity (Tonnes)	90	50	80	60

The warehouses supply tobacco to cigarette companies in three cities that have the following demand:

Cigarette company	Demand (Tonnes)
Bharat	120
Janata	100
Red Lamp	110

The following railroad shipping costs per tonne (in hundred rupees) have been determine:

Warehouse Location	Bharat	Janata	Red Lamp
A	7	10	5
B	12	9	4
C	7	3	11
D	9	5	7

Because of railroad construction, shipments are temporarily prohibited from warehouse at city A and to Bharat Cigarette company.

(a) Find the optimum distribution for XYZ tobacco company by using VAM method. 07

(b) Are there multiple optimum solutions? If yes identify them. 07

**OR**

Q.5 (a) Find initial feasible solution by 07

1. North – West corner method
2. List Cost Method (LCM)

(b) Find the optimum distribution for XYZ tobacco company after railroad construction is complete. 07

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