

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA-SEMESTER-III-EXAMINATION-WINTER-2024

Subject Code: 4539271**Date: 13/12/2024****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.
4. Use of simple calculators and non-programmable scientific calculators are permitted.

Q. No.		Marks
Q.1	Briefly explain the following: (a) Iconic Model (b) Infeasible Solution (c) Degeneracy (d) Single Server Queuing Model (e) Transition Probabilities (f) Saddle Point (g) Deterministic Model	14
Q.2	(a) What is meant by modelling in operations research? Discuss various classification of models briefly.	07
	(b) Explain the basic structure of a linear programming model. Discuss various guidelines for formulating a linear programming model.	07
OR		
	(b) Elaborate the scope and methodology of OR for solving an OR problem.	07
Q.3	(a) Bring out the differences between Unbounded Solution and Infeasible Solution when using graphical method of Linear programming.	07
	(b) Describe two phase method for solving the linear programming problem.	07
OR		
Q.3	(a) “Every linear programming problem has a mirror image in the form of another linear programming problem, called its dual”. Do you agree with the statement? Explain the primal-dual relationship detail in detail.	07
	(b) What is Sensitivity Analysis? Write a note on graphic approach to sensitivity analysis of LPP.	07
Q.4	(a) “The Markov chain method analyses the current behavior of a process and relates the existing characters to the future.” Elucidate this statement by taking examples from the functional areas of management.	07
	(b) Explain with examples the concept of dominance in game theory.	07

OR

- Q.4** (a) What is a game in game theory? Explain various properties of a game. **07**
- (b) A confectioner sells confectionery items. Past data of demand per week in hundred kilograms with frequency is given below: **07**

Demand/week	0	5	10	15	20	25
Frequency	2	11	8	21	5	3

Using the following sequence of random numbers, generate the demand for next 15 weeks. Also find out the average demand per week.

Random numbers:

35, 52, 90, 13, 23, 73, 34, 57, 35, 83, 94, 56, 67, 66, 60

Q.5 CASE STUDY:

A detergent producing company has three factories and four distribution centers. The quantity of monthly production of each factory, the demand of each distribution center and the associated transportation cost per quintal are given as follows:

Factories	Distribution Centers				Monthly Production (in quintals)
	W	X	Y	Z	
A	10	8	5	4	7000
B	7	9	15	8	8000
C	6	10	14	8	10000
Monthly Demand (in quintals)	6000	6000	8000	5000	

- (a) Find the initial solution by VAM Method. **07**
- (b) Is the solution generated above by VAM is optimal? If not, then find the optimal solution. **07**

OR

- Q.5** (a) If the company wants atleast 5000 quintals of detergent to be transported from factory C to distribution center Y, revise the matrix and identify the initial solution by VAM. **07**
- (b) Is the solution generated above by VAM is optimal? If not, then find the optimal solution and calculate the total cost of transportation. **07**
