Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 10197

M.B.A. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Second Semester

BA 4201 – QUANTITATIVE TECHNIQUES FOR DECISION MAKING

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Linear Programming.
2. What is decision making?
3. What is unbalanced transportation problem?
4. When we will face degeneracy transportation problem?
5. What are decision trees?
6. What is saddle point in game theory?
7. What is inventory? What are the types of inventory?
8. What is replacement model?
9. Define queue.
10. What is Monte Carlo Simulation?

PART B — (5 × 13 = 65 marks)

11. (a) Solve the LPP by simplex method

Max $z = 3x + 2y$

Subject to

$2x + y \leq 40$

$x + y \leq 24$

$2x + 3y \leq 60$

$x, y \geq 0$

Or

(b) Explain the special cases in L.P.P.

12. (a) Find the initial transportation cost using VAM and optimal solution using MODI.

	P	Q	R	S	Supply
A	12	10	12	13	500
B	7	11	8	14	300
C	6	16	11	7	200

Or

(b) Find the total processing time of allocating the jobs to the operators so that time is minimized.

Operators

Job	A	B	C	D	E
1	5	6	8	6	4
2	4	8	7	7	5
3	7	7	4	5	4
4	6	5	6	7	5
5	4	7	8	6	8

13. (a) The Parker flower shop promises its customers delivery within 4 hours on all flower orders. Parker's daily demand for roses is as follows:

Dozens of Roses	7	8	9	10
Probability	0.1	0.2	0.4	0.3

It purchases roses for Rs.10 per dozen and sells them for Rs.30. All unsold roses are donated to local hospital. How many dozens should if order to maximize its profits?

Or

(b) Solve the game and find the strategies of players

$$\begin{matrix} & B \\ A & \begin{bmatrix} 2 & 5 & 6 \\ 7 & 3 & 4 \end{bmatrix} \end{matrix}$$

14. (a) The demand of an item in a store is 18,000 units per year. The purchase price of the product is Rs.5 per unit and its carrying cost is Rs.1.2 per unit per year and the ordering cost is Rs.400 per order. The shortage cost is Rs.5 per unit per year. Find

(i) Economic order Quantity (4)
(ii) Number of orders per year (3)
(iii) Maximum shortage quantity (3)
(iv) Total cost of system (3)

Or

(b) An electronic equipment consists of 500 resistors. When any resister fails, it is replaced. The cost of replacing a resistor individually is Rs.20. if all the resisters are replaced at the same time, the cost per resister is Rs.5. the percent survival rate is given below :

Month	0	1	2	3	4	5
Percent survival rate	100	90	75	55	30	0

What is the optimum replacement plan?

15. (a) (i) What are the characteristics of Queuing System? (8)

(ii) List out the assumptions in single queue single server system. (5)

Or

(b) Explain the advantages and limitations of simulation. (7+6)

PART C — (1 × 15 = 15 marks)

16. (a) Solve the L.P.P by two phase method

Minimize $Z = 2X_1 + X_2$

Subject to

$$X_1 + X_2 \geq 6$$
$$7X_1 + X_2 \geq 14$$
$$X_1, X_2 \geq 0$$

Or

(b) Annual Demand for an item is 6000 units ordering cost is Rs.600 per order. Inventory carrying cost is 18% of purchase price per unit per year. The price break ups areas shown below.

Quantity	Price per unit (Rs.)
$0 \leq Q_1 < 2000$	20
$2000 \leq Q_2 < 4000$	15
$4000 \leq Q_3$	9

Find the optimal order size.