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Total Number of Pages: 03

Course: MBA  
Sub\_Code: MBQT1001

1<sup>st</sup> Semester Regular Examination: 2024-25

SUBJECT: Quantitative Techniques

BRANCH(S): MBA (A & M), MBA, LSCM, IB, HRM, FM&HRM, GM, FM, BA, MM, HCHM, RM

Time: 3 Hours

Max Marks: 100

Q.Code: R483

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions: (2 x 10)

- Define median of a distribution. Give one example of it.
- What do you mean by coefficient of variation?
- What do you mean by probable error?
- Define correlation.
- What do you mean by basic feasible solution?
- Define slack and surplus variable.
- Give the standard form of LPP.
- What do you mean by unbalanced transportation problem and how it is balanced?
- What do you mean by decision making under uncertainty?
- What are the different queue disciplines?

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) The run scored by two batsmen in eight matches are given below

Batsman- A	27	16	39	45	101	80	40	52
Batsman-B	0	100	80	5	60	40	10	121

Who is better run scorer? Also find which of these two batsmen is consistent in scoring.

- b) Explain Scatter diagram as a measure of correlation.  
c) Ten students got the following percentage of marks in QT and Business Research (BR):

Roll No.	1	2	3	4	5	6	7	8	9	10
Marks in QT	78	36	98	25	75	82	90	62	65	39
Marks in BR	84	51	91	60	68	62	86	58	53	47

Find the Rank correlation coefficient and interpret it.

- What are regression lines? Why is it necessary to consider two lines of regression?
- Discuss the different type of Queue behavior.
- What do you mean by Markov chains? Discuss its managerial applications.

- g) A firm manufactures two types of products A and B and sells them at a profit of Rs. 2/- on type A and Rs. 3/- on type B. Each product is processed in two machines C and D. Type A requires 1 minute of processing time in machine C and 2 minutes in machine D; type B requires one minute in each machine C and D. Machine C is available for not more than 6 hour 40 minutes and machine D is available for 10 hours during any working day. Formulate the problem as linear programming problem.
- h) What do you mean by assignment problem? Give its mathematical formulation.
- i) Solve the following assignment problem using Hungarian method

	I	II	III	IV	V
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

- j) A TV mechanic finds that the time spent on his job has an exponential distribution with mean 30 minutes, if he repairs the set in the order in which they come in. If the arrival of the set is approximately Poisson with an average rate of 10 per eight-hour day. What is the mechanic's expected idle time each day? How many jobs are ahead of the average set just brought in?
- k) A manufacturing company keeps stock of a special product. Previous data shows the daily demand of the product as below.

Daily demand	5	10	15	20	25	30
Probability	0.01	0.20	0.15	0.50	0.12	0.02

Simulate the demand for the next ten days. Also find the daily average demand for the product on the basis of simulated data. Use the random number- 82, 96, 18, 96, 20, 84, 56, 11, 52, 03.

- l) A newspaper boy has the following probabilities of selling the magazine.

No. of copies sold	10	11	12	13	14
Probability	0.10	0.15	0.20	0.25	0.30

Cost of a copy is Rs. 30/- and sale price is Rs. 50/-. He can't return the unsold copies; how many copies should he order to maximize his profit.

### Part-III

#### Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3 Explain the managerial applications of central tendency and dispersion. In trying to evaluate the effectiveness of the advertising campaign, a company compiled the following information. (16)

Year	2016	2017	2018	2019	2020	2021	2022	2023
Advertising Expenditure ('000Rs.)	12	15	15	23	24	38	42	48
Sales (Lakh Rs.)	5.0	5.6	5.8	7.0	7.2	8.8	9.2	9.5

Calculate the regression equations of sales on advertising expenditure and advertising expenditure on sales. Estimate the probable sales when advertising expenditure is Rs.60,000/-, also estimate the probable advertising expenditure when sales is Rs.9,00,000/-.

**Q4** Discuss few management applications and advantages of linear programming techniques. (16)  
Solve the following linear programming problem (LPP) using Simplex method.

$$\text{Max. } Z = 3x_1 + 5x_2 + 4x_3$$

Subject to;

$$2x_1 + 3x_2 \leq 8$$

$$2x_2 + 5x_3 \leq 10$$

$$3x_1 + 2x_2 + 4x_3 \leq 15$$

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

**Q5** Give the mathematical formulation of Transportation Problem. Find the optimal solution to the following transportation problem using MODI method, the cell entries show the unit transportation cost. (16)

		To			Available
		I	II	III	
From	A	2	7	4	5
	B	3	3	1	8
	C	5	4	7	7
	D	1	6	2	14
Required		7	9	18	

**Q6** Discuss the dominance property of game theory. Use the principle of dominance and solve the following game. (16)

		Player-B		
		3	-2	4
Player-A	-1	4	2	
	2	2	6	