

AR16

Code: 16MBA1006

SET-I

ADITYA INSTITUTE OF TECHNOLOGY AND MANAGEMENT, TEKKALI
(AUTONOMOUS)

I MBA I Semester Regular Examinations, December-2016

QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS

Time: 3 Hrs

Max. Marks: 60

Answer any Five questions
All questions carry EQUAL marks
Question No. 8 is Compulsory

1. a) Explain the basic assumptions and properties of Binomial Probability Distribution. [5M]
b) A clerk enters 75 words per minute with 6 errors per hour. What is the probability of 0 errors in a 255-word cash transaction? [7M]
2. a) What are the various steps involved in Hypothesis Testing? Illustrate. [5M]
b) In a sample survey of 2000 customers, it is revealed that acceptance rate of a product is 32%. As per accepted norms marketing of a new product will be Pursued only if acceptance rate exceeds 30%. Do you launch the product into the market? Test the hypothesis at 1% level. [7M]
3. a) Does correlation means causation? Illustrate. [5M]
b) In a correlation study, the following values are obtained: Mean of x and y are 65 and 67, Standard Deviations of x and y are 2.5 and 3.5 respectively. Coefficient of Correlation is 0.8. Obtain two regression lines. [7M]
4. a) A firm manufactures two products: X_1 and X_2 . For manufacturing X_1 , 2 Units of Labour and 2 units of capital is required. For manufacturing X_2 , 3 units of labour and 1 units of capital is required. The available Labour and capital is 18 units and 12 units respectively. The company get a profit of Rs.10 on X_1 and Rs.12 on X_2 . Formulate this LPP and determine the maximum profit by allocating the resources optimally on X_1 and X_2 by graphic method. [6M]
b) Use Simplex method to solve the L.P.P. [6M]
Maximise $Z = 10x_1 + 8x_2$
subject to
 $4x_1 + 2x_2 \geq 1600$
 $2x_1 + 5x_2 \geq 2000$
 $x_1, x_2 \geq 0$.

5. a) Explain the mixed strategies of solving $2 \times n$ and $m \times 2$ games and find the value of the game (V). [4M]
 b) Explain the dominance principle in game theory using the following problem: [8M]

		Firm B	B₁	B₂	B₃	B₄
Firm A	A₁		35	65	25	5
	A₂		30	0	15	0
	A₃		45	50	0	10
	A₄		55	60	10	15

6. The cost of transportation per unit from three sources and four destinations are given here. Obtain initial basic feasible solutions using the following methods. [12M]
 1. North West corner method.
 2. Vogel's approximation method.

Source	Destination				Supply
	A	B	C	D	
1	4	2	7	3	250
2	3	7	5	8	450
3	9	4	3	1	500
Demand	200	400	300	300	

7. A project consists of seven activities and the time estimates of the activities are furnished as under: [12M]

Activity	Optimistic Days	Most Likely Days	Pessimistic Days
1-2	1	4	7
1-3	5	10	15
2-4	3	3	3
2-6	1	4	7
3-4	10	15	26
3-5	2	4	6
4-5	5	5	5
5-6	2	5	8

- a) Draw the network diagram.
 b) Identify critical path and its duration.
 c) What is the probability that project will be completed in 5 days earlier than the critical path duration?
8. **CASE STUDY:** [12M]
 The average monthly sales of 5000 firms are normally distributed with mean of Rs.36,000 and Standard deviation of Rs.10,000. Find
 a) The number of firms having sales over 40,000
 b) The number of firms having sales between Rs.30,000 and Rs.40,000.
 c) The number of firms having sales between Rs.38,500 and Rs.41,000

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1. Explain the 'Big -M' method for solving a linear programming problem.
2. Solve the following LPP using simplex method.

$$\text{Max } Z = 4X_1 + 5X_2 - 3X_3$$

Subject to the constraints

$$X_1 + X_2 + X_3 = 10; \quad X_1 + X_2 \geq 1; \quad 2X_1 + 3X_2 + X_3 \leq 30 \quad \text{and} \quad X_1, X_2, X_3 \geq 0$$

3. Find an initial basic feasible solution to the following Transportation Problem using NWC and LCM methods

	A	B	C	D	E	Supply
I	5	4	8	6	5	600
II	4	5	4	3	2	400
III	3	6	5	8	4	1000
Deman	450	400	200	250	300	

4. Solve the following assignment problem

	A	B	C	D
I	1	4	6	3
II	9	7	10	9
III	4	5	11	7
IV	8	7	8	5

5. Solve the following game:

Strategy

		Player B			
		I	II	III	IV
Player A	I	3	2	4	0
	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

6. Explain the procedure for testing of hypothesis? Pointed out the difference between one tailed and two tailed tests.
7. Obtain the equations of two lines of regression for the following data. Also obtain the estimate of X for Y = 70.

X:	65	66	67	67	68	69	70	72
Y:	67	68	65	68	72	72	69	71

8. A project schedule has the following characteristics

Activity:	1 -2	1 - 3	2 - 4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-10	9-10
Time:	4	1	1	1	6	5	4	8	1	2	5	7

Find Critical Path