

**ANURAG Engineering College**

(An Autonomous Institution)

**I MBA II Semester Regular Examinations, July/August – 2024  
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS  
(MASTER OF BUSINESS ADMINISTRATION)****Time: 3 Hours****Max. Marks: 60****Section – A (Short Answer type questions)****(10 Marks)****Answer All Questions**

1. Give any three definitions of Operations Research.
2. What are the Shortcomings of Operations Research.
3. Define the following terms in the context of LPP  
i) Feasible Solution ii) Basic Feasible Solution.
4. Write down the role of pivot element in simplex table.
5. Illustrate the method of drawing lines in the context of assignment problem.
6. How do you convert an unbalanced transportation problem into balanced transportation problem?
7. The following is the payoff matrix of a Super Bazaar. Use Laplace criterion to solve the same.

		Strategies			
		A	B	C	D
Events	E <sub>1</sub>	7	12	20	27
	E <sub>2</sub>	10	9	10	25
	E <sub>3</sub>	23	20	14	23
	E <sub>4</sub>	32	24	21	17

8. What are dummy activities? When do you need dummy activity into your network?
9. Describe two-person zero sum game, with any two basic assumptions.
10. Define Queue System.

Course Outcome	B.T Level	Marks
CO1	L1	1M
CO1	L1	1M
CO2	L1	1M
CO2	L2	1M
CO3	L2	1M
CO3	L2	1M
CO4	L2	1M
CO4	L2	1M
CO5	L1	1M
CO5	L1	1M

**Section B (Essay Questions)****Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) Discuss the nature and features of Operations Research.  
**OR**  
B) Describe the applications of Operations Research in the functional areas of management.
12. A) Use Graphical Method to solve the following Linear Programming Problem: Maximize  $z = 4x_1 + 3x_2$  subject to the constraints:  
 $2x_1 + x_2 \leq 1000,$   
 $x_1 + x_2 \leq 800,$   
 $x_1 \leq 400,$   
 $x_2 \leq 700,$  and  
 $x_1, x_2 \geq 0$

**OR**

**Question Paper Code: R22E12MB04**

B) Use Simplex Method to solve the following LPP

CO2            L3            10M

Maximize  $z = x_1 + 2x_2 + 3x_3$  subject to the constraints:

$$x_1 + 2x_2 + 3x_3 \leq 10,$$

$$x_1 + x_2 \leq 5, \text{ and}$$

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

13. A) A department head has four subordinates and four tasks to be performed. The subordinates differ in efficiency and the tasks are differ in their intrinsic difficulty. His estimate of time each man would take to perform each task is given below matrix.

CO3            L3            10M

		Subordinates			
		P	Q	R	S
Task	A	18	26	17	11
	B	13	28	14	26
	C	38	19	18	15
	D	19	26	24	10

How should the task be allocated, one to a man, so as to minimize the total man-hours?

**OR**

B) Use Vogel's Approximation Method to obtain an initial basic feasible solution to the following transportation problem.

CO3            L3            10M

	D	E	F	G	Supply
A	11	13	17	14	250
B	16	18	14	10	300
C	21	24	13	10	400
Demand	200	225	275	250	

14. A) A producer of boats has estimated the following distribution of demand for a particular kind of boat:

CO4            L3            10M

No. Demanded	0	1	2	3	4	5	6
Probability	0.14	0.27	0.27	0.18	0.09	0.04	0.01

Each boat cost him Rs.7,000 and he sells them for Rs.10,000 each. Any boat that are left unsold at the end of the season must be disposed of for Rs.6,000 each. How many boats should be in stock so as to maximize his expected profit?

**OR**

B) A small project consists of seven activities for which the relevant data are given below:

CO4            L3            10M

Activity	A	B	C	D	E	F	G
Preceding activity	-	-	-	A,B	A,B	C,D,E	C,D,E
Activity Duration (Days)	4	7	6	5	7	6	5

- i) Draw the network diagram and find the project completion time
- ii) Calculate the total float for each of the activity and highlight the critical path.

15. A) Briefly illustrate the various elements of a Queueing System.

CO5            L3            10M

**OR**

B) For a game with the following payoff matrix, determine the optimum strategies and the value of the game.

CO5            L3            10M

	Player P <sub>2</sub>	
Player P <sub>1</sub>	5	1
	3	4