Code No: 721CN **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MBA II Semester Examinations, October/November - 2022
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

Time: 3 Hours **Max.Marks:75**

Answer any five questions
All questions carry equal marks
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1.a) Discuss the origin and development of operations research.
b) Define model. Discuss the types of modeling? [8+7]

2.a) Write down the opportunities using the OR models.
b) Operations research is tool for "Decision support system." Justify. [7+8]

3.a) Explain the terminologies of linear programming problem.
b) A manufacturer of furniture makes two products – chairs and tables. Processing of this product is done on two machines A and B. A chair requires 2 hours on machine A and 6 hours on machine B. A table requires 5 hours on machine A and no time on machine B. There are 16 hours of time per day available on machine A and 30 hours on machine B. Profit gained by the manufacturer from a chair and a table is Rs 2 and Rs 10 respectively. What should be the daily production of each of two products? Solve it graphically.[7+8]

4.a) Define the balanced and unbalanced transportation problem with suitable example?
b) Find the optimal solution of the following linear programming problem? [7+8]

		I	II	III	IV	Supply
From	A	13	11	15	20	2000
	B	17	14	12	13	6000
	C	18	18	15	12	7000
	Demand	3000	3000	4000	5000	

5.a) Define assignment problem. Write the differences of Transportation and Assignment problem.
b) Solve the assignment problem whose effectiveness matrix is given in the table. [7+8]

	1	2	3	4
A	49	60	45	61
B	55	63	45	69
C	52	62	49	68
D	55	64	48	66

6.a) Explain the mathematical model of Travelling salesmen problem.

b) Consider the following traveling salesman problem. Design a tour to five cities to the salesman such that minimize the total distance. Distance between cities is shown in the following matrix. [7+8]

	1	2	3	4	5
1	-	10	3	6	9
2	5	-	5	4	2
3	4	9	-	7	8
4	7	1	3	-	4
5	3	2	6	5	-

7.a) What is decision tree? Explain the advantages and disadvantages of decision tree.

b) A businessman has to select three alternatives open to him each of which can be followed by any of the four possible events. The conditional pay-off (in Rs) for each action event combination are given below:

Alternative	Pay-offs conditional events			
	A	B	C	D
X	8	0	-10	6
Y	- 4	12	18	- 2
Z	14	6	0	8

Determine which alternative should the businessman choose, if he adopts the
i) Maximin criterion
ii) Maximax criterion
iii) Hurwicz criterion with degree of optimism is 0.7
iv) Minimax regret Criterion
v) Laplace criterion. [6+9]

8.a) Explain the M/M/1 queueing model and write it characteristics.

b) In a railway marshaling yard, goods trains arrive at a rate of 30 trains per day. Assuming that the inter-arrival time follows an exponential distribution, and the service time is also exponential with an average of 36 minutes i) The mean queue size ii) The probability that the queue size exceeds 10. [7+8]

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