Code No: 721CN

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MBA II Semester Examinations, May - 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)   What is Operations Research? Explain the origin of OR.
  b)   Explain the nature and scope of operations research.   [7+8]

2.a)   Explain the different models used in OR.
  b)   Write the applications of OR in different managerial areas.   [7+8]

3.a)   What is LPP? Write the assumptions of LPP.
  b)   Solve the following LPP by graphical method
       Maximize $Z = 45x_1 + 80x_2$

       Subject to

       $5x_1 + 20 x_2 \le 400$
       $10x_1 + 15x_2 \le 450$
       $x_1 \ge 0 , x_2 \ge 0$ [5+10]

4.a)   Define the Transportation problem. Write its mathematical model.
  b)   Determine the minimum cost to the following transportation problem using Vogel's
       method.   [6+9]

	D1	D2	D3	D4	D5	Capacity
O1	2	11	10	3	7	4
O2	1	4	7	2	1	8
O3	3	9	4	8	12	9
Demand	3	3	4	5	6	21

(From)

5.a)   Define assignment problem. Write its mathematical model of solving assignment
       problem.
  b)   A department head has four subordinates, and four tasks have to be performed.
       Subordinates differ in efficiency and tasks differ in their intrinsic difficulty. Time each
       man would take to perform each task is given in the effectiveness matrix. How the tasks
       should be allocated to each person so as to minimize the total man-hours?   [6+9]

Subordinates

		I	II	III	IV
Tasks	A	8	26	17	11
	B	13	28	4	26
	C	38	19	18	15
	D	19	26	24	10

6.a)   Solve the following travelling assignment problem.

	1	2	3	4	5
1	∞	7	9	6	1
2	7	∞	3	4	9
3	9	3	∞	2	5
4	6	4	2	∞	3
5	1	9	5	3	∞

  b)   Write the assignment algorithm for solving Assignment problem.   [10+5]

7.a)   Explain the various decision-making environments in decision theory.
  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   [5+10]

8.a)   What is Queue? Explain the basic structure of queuing models.
  b)   Assume that at a bank teller window the customer arrives at an average rate of 20 per hour according to Poisson distribution. Assume also that the bank teller spends an average of 30 customers per hour. Find i) The utilization factor of the queue ii) Expected waiting time in the system per customer. iii) The probability of zero customers in the system.   [5+10]

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