R19

Code No: 762AD

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MBA II Semester Examinations, February/March - 2025
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS

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

Note: i) Question paper consists of Part-A, Part-B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART - A

(25 Marks)

1.a)	What are the models in operations research?	[5]
b)	Discuss the role of surplus variable in the simplex method.	[5]
c)	What is degeneracy in transportation problem?	[5]
d)	What do you mean by decision tree? Explain.	[5]
e)	What is Saddle Point?	[5]

PART – B

(50 Marks)

2. What is operations research? Explain its significance in problem solving and decision making. [10]

OR

3. Write the differences between quantitative and qualitative analysis. Explain the process for developing an operations research model. [10]

4. A firm manufactures headache pills in two sizes A and B. Size A contains 3 grains of aspirin, 3 grains of bicarbonate and 4 grains of codeine. Size B contains 4 grains of aspirin, 8 grains of bicarbonate and 6 grains of codeine. It is found by users that it requires at least 62 grains of aspirin, 74 grains of bicarbonate and 64 grains of codeine for providing immediate relief. Formulate the problem as standard LPP and solve by using graphical method. [10]

OR

5. Solve the following LPP using Simplex Method: [10]

$$\text{Max } Z = 40x_1 + 60x_2 + 31x_3$$
$$\text{Subject to } 4x_1 + 5x_2 + 3x_3 \leq 90$$
$$3x_1 + 2x_2 + 3x_3 \leq 54$$
$$2x_1 + 4x_2 + 3x_3 \leq 124$$
$$x_1, x_2, x_3 \geq 0.$$

6. Using the following cost matrix determine optimal job assignment and the associated cost: [10]

		Jobs				
		1	2	3	4	5
Persons	A	8	4	2	6	1
	B	0	9	5	5	4
	C	3	8	9	2	6
	D	4	3	1	0	3
	E	9	5	8	9	5

OR

7. Find the optimal solution to the following transportation problem where cell entries are unit costs. [10]

	D_1	D_2	D_3	D_4	D_5	Available
S_1	68	35	4	74	15	18
S_2	57	88	91	3	8	17
S_3	91	60	75	45	60	19
S_4	52	53	24	7	82	13
S_5	51	18	82	13	7	15
Required	16	18	20	14	14	82

8. A company is faced with the problem of determining the optimum number of a certain magazine to order. The magazine costs Rs.5 and sells at Rs.10 per copy. If the company orders more copies than it can sell, the unsold copies can be returned under the prior wholesale contract for a refund under the following formula: upto first 500 copies, refund is Rs.3 for each unsold copy; between 501 to 1,000 copies, refund is Rs.2 for each copy and for over 1,000 copies, it is Rs.1 per copy. The sale record of past 100 weeks is given below:

No. of Copies sold/week	:	4,000	5,000	6,000	7,000	8,000
No. of Weeks	:	10	25	35	20	10

a) What is the optimum decision?
b) Compute the expected maximum profit. [5+5]

OR

9. Draw a network diagram corresponding to the following information. Obtain the early and late start and completion times. Also determine the critical path and duration of the project. [10]

Activity	1-2	1-3	2-6	3-4	3-5	4-6	5-6	5-7	6-7
Duration (days)	4	6	8	7	4	6	5	19	10

10. In a bank, cheques are cashed at a single teller counter. Customers arrive at the counter in a Poisson manner at an average rate of 30 customers per hour. The teller takes on an average 1½ minutes to cash the cheque. The service time is exponentially distributed.
a) Calculate the percentage time the teller is busy.
b) Calculate the average time a customer is expected to wait. [5+5]

OR

11. Solve the game with the payoff matrix shown in the following table, using the algebraic method: [10]

Player A's Strategies	Player B's Strategies		
	B1	B2	B3
A1	7	4	4
A2	3	5	8

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