Code No: 156DY **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, March - 2024
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS
(Common to CE, EEE, CSE, IT, CSE(AI&ML), CSE(DS))

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 is the primary focus of Operations Research?	[2]
b)	Define the Duality Principle.	[3]
c)	Write about Degeneracy.	[2]
d)	What is North-West Corner rule?	[3]
e)	What are the types of replacement problems?	[2]
f)	Define group replacement in the context of low-cost items.	[3]
g)	What is Saddle Point?	[2]
h)	What are the limitations of Games Theory?	[3]
i)	What is Queuing Model?	[2]
j)	Write about Monte Carlo Method.	[3]

PART – B

(50 Marks)

2.a) Discuss about the nature and scope of Operations Research.
b) Explain the process of developing an Operational Research Model. [5+5]

OR

3.a) Explain about the graphical method used in Linear Programming.
b) Solve the LPP by using graphical method
Maximize $Z= 50X_1 + 60X_2$
Subject to: $2X_1+ X_2 \leq 300$;
$4X_1+ 8X_2 \leq 900$; and $X_1, X_2 \geq 0$. [5+5]

4.a) Discuss the steps involved in formulating and solving the Transportation Problem. Provide a detailed example.
b) Consider the following assignment problem of assigning four operators to four machines. The cost matrix is as follows:

		Machine			
		1	2	3	4
Operator	1	5	5	--	2
	2	7	4	2	3
	3	9	3	5	--
	4	7	2	6	7

Operator 1 cannot be assigned to 3. Similarly operator 3 cannot be applied to 4. Find the minimum cost. [4+6]

OR

5.a) Discuss the Application of the Transportation Model in detail.

b) Explain about Traveling Salesman Problem in Operations Research. [5+5]

6.a) Identify the situations which make the replacement of items necessary.

b) A truck is priced at Rs. 2,00,000 and running costs are estimated at Rs.10,000 for each of first four years, increasing by Rs. 2,000 per year in the fifth and subsequent years. If the value of money is 10 percent, when should be the truck be replaced? Assume zero salvage value. [4+6]

OR

7.a) Discuss the economic implications of choosing replacement strategies for capital cost items.

b) Illustrate the decision-making process for replacing capital cost items using practical examples. [5+5]

8.a) What is Game Theory, and how does it apply to decision-making?

b) For the following game, find optimal strategies of A and B and value of game using principle of dominance: [4+6]

	Player B			
	7	6	8	9
Player A	-4	-3	9	10
	3	0	4	2
	10	5	-2	0

OR

9.a) Solve the following sequence game using dominance property.

		Company A			
		I	II	III	IV
Company B	A	14	4	8	18
	B	8	3	2	12
	C	8	7	-6	16
	D	6	5	12	10

b) Describe the concept of Decision Trees and their role in decision analysis. [6+4]

10.a) Identify the basic elements of a Queuing Model, and how do they contribute to understand the system dynamics?

b) Compare and contrast First-Come-First-Serve (FCFS) queue discipline with other queue disciplines. [5+5]

OR

11.a) Analyze the nature and scope of Simulation and its role in decision-making.

b) Discuss how simulation is applied in specific industries? Illustrate with examples. [5+5]

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