Code No: 156DY **R18**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year II Semester Examinations, July - 2023
QUANTITATIVE ANALYSIS FOR BUSINESS DECISIONS
(Common to CE, EEE)

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)	Explain Graphical method for solving a linear programming problem.	[2]
b)	Discuss the Scope of Operations Research.	[3]
c)	Tell different applications of Assignment Models.	[2]
d)	Give the list of steps involved in transportation problems.	[3]
e)	What are the uses of replacement models?	[2]
f)	List out different types of replacement problems.	[3]
g)	Give the importance of Decision making.	[2]
h)	What is the mixed strategy in Game Theories?	[3]
i)	Explain the nature of Simulation.	[2]
j)	Identify different elements of Exponential Service times.	[3]

PART – B

(50 Marks)

2.a) Solve the Liner programming problem by using simplex method.

Min. $z= -3X_1+4X_2$
Subjected to $X_1+2\ X_2 \leq 8$
$3\ X_1+2\ X_2 \leq 12$
$X_1, X_2 \geq 0$

b) Illustrate different types of models in linear programming with reference to operations research. [5+5]

OR

3.a) Demonstrate about Duality principle with respective to Artificial variable.

b) Solve the Linear programming problem by using the graphical method.

Max $Z = 5x + 3y$
Subjected to $3x+ 5y \leq 15$
$5x + 2y \leq 10$
$x \geq 0, y \geq 0.$ [5+5]

4. Don Levine Corporation is considering adding an additional plant to its three existing facilities in Decatur, Minneapolis, and Carbondale. Both St. Louis and East St. Louis are being considered. Evaluating only the transportation costs per unit as shown in the table, which site is the best? [10]

	From Existing Plants($)			
To	Decatur	Minneapolis	Carbondale	Demand
Blue Earth	20	17	21	250
Ciro	25	27	20	200
Des Moines	22	25	22	350
Capacity	350	300	150	

OR

5. A Travelling salesman has to visit five cities. He wishes to start from a particular city, visit each city once and then return to his starting point. The travelling cost (in Rs.) of each city from a particular city is given below.

		To city				
		A	**B**	**C**	**D**	**E**
From city	**A**	α	2	5	7	1
	B	6	α	3	8	2
	C	8	7	α	4	7
	D	12	4	6	α	5
	E	1	3	2	8	α

What should be the sequence of the salesman's visit, so that the cost is minimum? [10]

6. Let the value of money be assumed to be 10% per year and suppose that machine A is replaced after every 3 years whereas machine B is replaced after every six years. The yearly costs both of the machines are given below:

Year	1	2	3	4	5	6
Machine - A	1000	200	400	1000	200	400
Machine - B	1700	100	200	300	400	500

Determine which machine should be purchased. [10]

OR

7. Machine A costs Rs. 3,600. Annual operating costs are Rs. 40 for the first year and then increase by 360 every year. Assuming that machine A has no resale value, determine the best replacement age. Another machine B, which is similar to machine A, costs Rs. 4,000. Annual running costs are Rs. 200 for the first year and then increase by Rs. 200 every year. It has resale value of Rs. 1,500, Rs. 1,000 and Rs. 500, if replaced at the end of first, second and third years respectively. It has no resale value during fourth year and onwards. Which machine would you prefer to purchase and why? Future costs are not to be discounted. [10]

8. Two companies competing for market share. The following game represent the payoff for Company A over the other company B. Solve the game and determine the value of the game. [10]

		Company B		
Company A		High promotional campaign	Moderate promotional campaign	Low promotional campaign
	High promotional campaign	12	-8	-2
	Moderate promotional campaign	6	7	3
	Low promotional campaign	-10	-6	2

OR

9.a) Discuss the different steps involved in process of decision analysis with suitable examples.

b) Illustrate the concept of Rules of dominance with reference to game theory. [5+5]

10.a) Demonstrate different Basic Elements of the Poisson Arrivals in detail.

b) Identify and discuss role of Random Numbers with reference to simulation. [5+5]

OR

11.a) Discuss different types of simulation with its advantages and disadvantages.

b) Elucidate different Queuing models with FCFS Queue discipline with reference to Single service station. [5+5]

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