R09

Code No: F3204

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, June/July - 2018
OPERATIONS RESEARCH

Time: 3hrs   Max.Marks:60

Answer any five questions
All questions carry equal marks
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1.a) What is convex set? Explain with suitable examples.

  b) Use graphical method to solve the following LPP. Examine whether the LPP has any alternative solution, other than you found

  Minimize $Z=20x_1+30x_2$

  Subject to $x_1 \geq 5$

  $2x_2 \geq 7$

  $4x_1+6x_2 \leq 24$

  $x_1 \geq 0, x_2 \geq 0$ [6+6]

2.a) Give the applications of transportation problem in industries.

  b) Find the optimal solution to the following transportation problem using VAM-MODI method each cell value being the unit cost.   [6+6]

	D_1	D_2	D_3	D_4	D_5	Supply
C_1	35	41	28	16	20	285
C_2	14	21	28	30	15	145
C_3	45	18	17	29	26	165
Demand	125	125	100	100	175	

3.a) Discuss how you get multiple solutions in an assignment problem.

  b) A company producing a single product and selling it through five agencies situated in different cities. All of a sudden there is a demand for the production at another five cities not having any agency of the company. The company faced with the problem of deciding as how to assign the existing agencies to dispatch the product to needy cities in such a way that the total traveling distance is minimized. The distance between the surplus and deficit cities (in kilometers) is given by

Surplus city \ Deficit city	A'	B'	C'	D'	E'
A	10	5	9	18	11
B	13	19	6	12	14
C	3	2	4	4	5
D	18	9	12	17	15
E	11	6	14	19	10

Determine the optimum assignment schedule.   [6+6]

4.a) Describe various sequencing models.
 b) A company has six jobs which go through 3 machines X,Y and Z in order XYZ. The processing time in minutes for each job on each machine is given as follows. Find the sequence that minimizes the total elapsed time required to complete the following tasks. [6+6]

		Jobs					
		1	2	3	4	5	6
	X	18	12	29	36	43	37
Machines	Y	7	12	11	2	6	12
	Z	19	12	23	47	28	36

5.a) Distinguish between gradual failures and sudden failures and their effects.
 b) A decorative series lamp set circuit contains 10,000 bulbs, when any bulb fails it is replaced and the cost of replacing a bulb individually is Rs. 1 only. If all the bulbs are replaced at the same time the cost per bulb would be reduced to 35 paise. The percent surviving say s(t) at the end of month t, are given as

t	1	2	3	4	5	6
$s(t)$	97	90	70	30	15	0

Determine the optimal replacement policy. [6+6]

6.a) What are the salient features of the dynamic programming approach?
 b) Explain the principle of optimality. Give its applications. [6+6]

7.a) Define a rectangular game and explain the approaches of solving it.
 b) Solve the following game graphically. [6+6]

Player B

		1	-3
		3	5
Player A		-1	6
		4	1
		2	2
		-5	0

8.a) What are the advantages of having inventory?
 b) An aircraft company uses rivets at an approximate consumption rate of 2,500 kg per year. The rivets cost Rs. 30 per kg and the company personnel estimates that it costs Rs. 130 to place an order and the inventory carrying cost is 10% per year. How frequently should orders for rivets be placed and what quantities should be ordered? [6+6]

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