Code No: 821AJ **R15**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
MCA II Semester Examinations, January - 2018
OPERATIONS RESEARCH

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

5 × 5 Marks = 25

1.a) Explain the limitations of operations Research. [5]
b) Give and explain Mathematical model of "Assignment problem". [5]
c) Explain the usefulness of sequencing modes. [5]
d) What is dynamic programming approach? Explain. [5]
e) What is EOQ(Economic order quantity)? What is its significance? [5]

PART - B

5 × 10 Marks = 50

2.a) Using two phase method solve the LPP:
Miximize

$$p = 2x_1 + 4x_2 + 3x_3$$
$$s.t.\ 3x_1 + 4x_2 + 3x_3 \le 3600$$
$$2x_1 + x_2 + 3x_3 \le 2400$$
$$x_1 + 3x_2 + 3x_3 \le 4800 \ and$$
$$x_1 \ge 0,\ x_2 \ge 0,\ x_3 \ge 0$$

b) Explain the concept of unbound solution. [5+5]

OR

3. With the Big-M method [10]
Maximize

$$z = 3x_1 - x_2$$
$$s.t.\ 2x_1 + x_2 \ge 2$$
$$x_1 + 3x_2 \le 3$$
$$x_2 \le 4 \ and$$
$$x_1,\ x_2 \ge 0$$

4. Find the Initial Basic Feasible solution of the Transportation problem where cost matrix is given below [10]

		Destination				Supply
		A	B	C	D	
origin	I	1	5	3	3	34
	II	3	3	1	2	15
	III	0	2	2	3	12
	IV	2	7	2	4	19
Demand		21	25	17	17	

OR

5. Explain Hungarian method for optimal solution through an example. [10]

6. There are 4 jobs each of which has to go through the machines M_1, M_2, M_3, M_4, M_5, and M_6, in order Processing Times are given below.

		Machine					
		M_1	M_2	M_3	M_4	M_5	M_6
Job	A	20	10	9	4	12	27
	B	19	8	11	8	10	21
	C	13	7	10	7	9	17
	D	22	6	5	6	10	14

Determine a sequence of these four jobs which minimizes the total elapsed time T. [10]

OR

7. Illustrate any two Replacement models with numerical examples. [10]

8. Solve using dynamic programming approach.
Maximize

$z = 8x_1 + 7x_2$

$s.t.\ 2x_1 + x_2 \le 8$

$5x_1 + 2x_2 \le 15\ and$

$x_1, x_2 \ge 0$

[10]

OR

9.a) Explain minimax method of optimal strategies.
b) Explain the term competitive games, saddle point, value of the game with examples. [5+5]

10. Explain an inventory model where demand rate is uniform and production rate is uniform. Illustrate your answer with a numerical example. [10]

OR

11. Explain the following Models

a) $\{(M/M|1):(\infty/FCFS)\}$

b) $\{(M/M|1):(N/FCFS)\}$

Illustrate your answers with numerical examples. [5+5]

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