

ID. No. 24478

B.Tech. 7th Semester F. Scheme Mechanical Engg.-VII

Examination, May-2014

OPERATION RESEARCH

Paper-ME-405-F

Time allowed : 3 hours] [Maximum marks : 100

Note : Attempt five questions in total selecting at least one from each section. Question No. 1 is compulsory.

1. (a) What is the role of OR in decision making ?
- (b) Write mathematical model for general transportation problem.
- (c) Explain the queue parameters.
- (d) What is simulation ? Explain.

Section-A

2. What is OR ? Describe its applications in industry.
3. Solve by Simplex method the following L.P. problem :

$$\text{Minimize } Z = x_1 - 3x_2 + 3x_3$$

$$\text{subject to } 3x_1 - x_2 + 2x_3 \leq 7$$

$$2x_1 + 4x_2 \geq -12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

$$x_1, x_2, x_3 \geq 0$$

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[P.T.O.]

Section – B

4. Find the optimum solution for the following transportation problem in which the cell values are unit transportation costs in rupees.

	A	B	C	Total
I	1	2	3	50
II	3	2	1	80
III	4	5	6	75
IV	3	1	2	95
Total	120	80	100	

5. Use dual Simplex method to solve the following L.P.P:

$$\text{Minimize } Z = 3x_1 + 2x_2 + x_3 + 4x_4,$$

$$\text{subject to } 2x_1 + 4x_2 + 5x_3 + x_4 \geq 10,$$

$$3x_1 - x_2 + 7x_3 - 2x_4 \geq 2,$$

$$5x_1 + 2x_2 + x_3 + 6x_4 \geq 15,$$

$$x_1, x_2, x_3, x_4 \geq 0$$

Section–C

6. Obtain the steady state equation for the model M/M/1 and derive the formula for average number of units in the queue.

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7. Write note on :

- (i) PERT
- (ii) Crashing of project network
- (iii) Float in network
- (iv) Resources leveling in project

Section-D

8. Describe design models and model validation of simulation. Also explain process generation.
9. A newspaper boy has the following probabilities of selling a magazine "

No. of copies sold	Probability
10	0.10
11	0.15
12	0.20
13	0.25
14	0.30

Cost of a copy is 30 paise and sale price is 50 paise. He cannot return unsold copies. How many copies should he order ?