

Sixth Semester B.E. Degree Examination, Dec.2013/Jan.2014
Operations Research

Time: 3 hrs.

Max. Marks:100

*Note: Answer FIVE full questions, selecting
at least TWO questions from each part.*

PART – A

1. a. What is operation research? Mention six phases of an operation research study. (05 Marks)
 b. A manufacturer produces three models I, II, III of certain product using raw materials A and B. The following table gives the data for the problem formulate the LP model:

Raw material	Requirement per unit			Availability
	I	II	III	
A	2	3	5	4000
B	4	2	7	6000
Min demand	200	200	150	-
Profit per unit (Rs.)	30	20	50	-

(05 Marks)

c. Define:

- Feasible solution
- Feasible region
- Optimal solution
- Degeneracy
- Infeasible solution.

(10 Marks)

2. a. Define slack and surplus variables. (04 Marks)
 b. Find all the basic solutions of the following system of equation identifying in each case the basic and non basic variables:

$$2x_1 + x_2 + 4x_3 = 11$$

$$3x_1 + x_2 + 5x_3 = 14$$

(06 Marks)

- c. Solve the following LPP using simplex method in tabular form:

$$\text{Maximize } Z = 5x_1 + 3x_2$$

$$\text{Subject to, } x_1 + x_2 \leq 2$$

$$5x_1 + 2x_2 \leq 10$$

$$3x_1 + 8x_2 \leq 12$$

$$x_1, x_2 \geq 0$$

(10 Marks)

3. a. Express the following LPP in canonical form

$$\text{Maximize } Z = 2x_1 + 3x_2 + x_3$$

$$\text{Subject to, } 4x_1 - 3x_2 + x_3 \leq 6$$

$$x_1 + 5x_2 - 7x_3 \geq -4$$

$$x_1, x_2 \geq 0$$

(06 Marks)

- b. Explain the computational steps of Big-M method. (04 Marks)

c. Solve by Big-M method

$$\text{Minimize } Z = 4x_1 + x_2$$

$$\text{Subject to, } 3x_1 + x_2 = 3$$

$$4x_1 + 3x_2 \geq 6$$

$$x_1 + 3x_2 \leq 3$$

$$x_1, x_2 \geq 0.$$

(10 Marks)

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Victor M. Corman



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