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10CS/IS-61

Sixth Semester B.E. Degree Examination, Dec.2014/Jan.2015

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 operations research? Briefly explain the various phases of operations research study. (08 Marks)
- b. A person requires minimum 10, 12 and 12 units of chemicals for A, B and C respectively for his garden. A liquid product contains 5, 2 and 1 units of A, B and C respectively per jar. A dry product contains 1, 2 and 4 units of A, B and C per jar. If the liquid product sells for Rs.3 per jar and dry product sells for Rs.2 per jar, how many of each should be purchased in order to minimize the cost and meet requirement. (06 Marks)
- c. Use graphical method to solve the following :

$$\text{Max } z = 100x_1 + 40x_2$$

$$\text{Subjected to } 5x_1 + 2x_2 \leq 1000$$

$$3x_1 + 2x_2 \leq 900$$

$$x_1 + 2x_2 \leq 500$$

$$x_1, x_2 \geq 0$$

(06 Marks)

2. a. Solve the following LPP by using simplex method

$$\text{Max } z = 3x_1 + 2x_2 + 5x_3$$

$$\text{Subjected to } x_1 + 2x_2 + x_3 \leq 40$$

$$3x_1 + 2x_2 \leq 160$$

$$x_1 + 4x_2 \leq 420$$

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

(10 Marks)

- b. Explain the steps involved in setting up of a simplex method.

(10 Marks)

3. a. Solve the following LPP by using Big M method:

$$\text{Max } z = -2x_1 - x_2$$

$$\text{Subjected to } x_1 + x_2 = 3$$

$$x_1 + 3x_2 \geq 6$$

$$x_1 + 2x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

(10 Marks)

- b. Solve the following LPP by using two-phase method:

$$\text{Max } z = 5x_1 + 8x_2$$

$$\text{Subjected to } 3x_1 + 2x_2 \geq 3$$

$$x_1 + 4x_2 \geq 4$$

$$x_1 + x_2 \leq 5$$

$$x_1, x_2 \geq 0$$

(10 Marks)

(50 ML)

- $$x_1, x_2 \geq 0$$

(Marks)

- $$A_1 \cdot x_1 + x_2 \geq 0$$

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

(10 Marks)

- (10 Marks)

		Destination				
		D ₁	D ₂	D ₃	D ₄	Supply
Factory	F ₁	3	3	4	1	10
	F ₂	4	2	4	2	25
	F ₃	1	3	3	2	75
Demand		120	80	50	20	300

- (10 Marks)

- (03 Marks)

- (07 Marks)

- ([0 Marks]

- (20 Marks)**

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2 of 2