



MCX-010-001510

Seat No. _____

Third Year B. B. A. (Sem. V) (CBCS) Examination

May / June – 2018

510 : Operations Research - I

(New Course)

Faculty Code : 010

Subject Code : 001510

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Instruction : All questions are compulsory.

1 Solve given L.P.P. by Simplex Method : **14**

$$\text{Max. } Z = 3x_1 + 2x_2$$

Subject to constraint,

$$-x_1 + 2x_2 \leq 4$$

$$3x_1 + 2x_2 \leq 14$$

$$x_1 - x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

OR

1 (a) What do you understand by a Linear Programming Problem ? What are its major limitations ? **7**

(b) Solve the following L.P.P. by graphically : **7**

$$\text{Max. } Z = 4x_1 + 6x_2$$

Subject to constraint,

$$x_1 + x_2 = 5$$

$$x_1 \geq 2$$

$$x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

- 2 A company is spending Rs. 1,000 on Transportation of its units from three plants to four distribution centres. The supply and demand of units, with units cost of Transportation are given as :

		Distribution Centre				Availability
		D_1	D_2	D_3	D_4	
Plant	P_1	19	30	50	12	7
	P_2	70	30	40	60	10
	P_3	40	10	60	20	18
Requirements		5	8	7	15	

What can be the Maximum Saving by optimal scheduling ?

OR

- 2 (a) Show how to balance the Transportation model when it is unbalanced. Also explain the interpretation of the optimal solution of an unbalanced Transportation Problem. 7
- (b) Discuss the similarities and difference between Stepping Stone and MODI method. 7

- 3 A firm produces four products. There are four operators who are capable of producing any of these four products. The processing time varies from operator to operator. The firm records 8 hours a day and allow 30 minutes for lunch. The processing time in minutes and the profit for each of the product are given below :

Operators	Products			
	A	B	C	D
1	15	9	10	6
2	10	6	9	6
3	25	15	15	9
4	15	9	10	10
Profit (Rs. per unit)	8	6	5	4

Find the optimal assignment of product to operators.

OR

- 3 (a) What is Assignment Problem ? Discuss its method of solution. 7
- (b) How will you handle the following situations in an assignment problem ? 7
- (1) Maximization
- (2) Unbalanced problem.

- 4 (a) Discuss various types of research. 7
- (b) Explain meaning and objective of research. 7

OR

- 4 (a) What are the sources of secondary data ? Discuss. 7
- (b) Explain Principles of Good Research. 7

- 5 (a) Explain advantages and characteristics of non-parametric test. 7
- (b) Use the Kruskal Wallis test at 5% level of significance to test the null hypothesis that a professional bowler performs equally well with the four bowling balls, given the following results :

<i>With Ball No. A</i>	271	282	257	248	262
<i>With Ball No. B</i>	252	275	302	268	276
<i>With Ball No. C</i>	260	255	239	246	266
<i>With Ball No. D</i>	279	242	297	270	258

OR

- 5 (a) Explain Sign Test. 7
- (b) Explain U test or Wilcoxon-Mann Whitney test. 7
