



HDY-003-1173003 Seat No. _____

M. Sc. (Statistics) (Sem. III) (CBCS) Examination

November / December – 2017

MS-303 : Optimizing Techniques

Faculty Code : 003

Subject Code : 1173003

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

[Total Marks : 70

Instructions :

- (1) Attempt all questions.
- (2) Each question carries equal marks.

1 Answer the following : (any Seven) 14

- (i) Define Feasible Solution.
- (ii) Define Unbounded Solution.
- (iii) Name the types of variables added in LP problem to convert it into standard form. Define Two person game.
- (iv) Define Zero sum game.
- (v) Write limitation of Arithmetic Method for solution of 2×2 game.
- (vi) Give second name of Big-M Method.
- (vii) Name three methods to obtain an initial solution for Transportation Problem.
- (viii) When any Transportation problem is said to be Unbalanced ?
- (ix) Define : Slack variable and Surplus Variable.

2 Answer the following : (any two) 14

- (1) Write a brief note on Simplex Method.
- (2) Explain mathematical formulation of LP problem.
- (3) Define following terms :
 - (i) Basic feasible solution
 - (ii) Unbounded solution
 - (iii) Surplus variable

3 Answer the following : 14

- (1) Explain strategy in game theory.
- (2) Solve the following LP problem using graphical method.

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

$$\text{s.to c } 2x_1 + 4x_2 \leq 4$$

$$4x_1 + 8x_2 \leq 16 \text{ where } x_1, x_2 \geq 0.$$

OR

3 Answer the following : 14

- (1) Explain steps for PERT and CPM techniques.
- (2) Solve given assignment problem using Hungarian method :

	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
<i>A</i>	42	35	28	21
<i>B</i>	30	25	20	15
<i>C</i>	30	25	20	15
<i>D</i>	24	20	60	12

4 Answer the following : (any two) 14

- (1) Explain types of failure in Replacement problem.
- (2) Solve given LP problem using Big – M method.

$$\text{Min } Z = 600x_1 + 500x_2$$

$$\text{s to c. } 2x_1 + x_2 \geq 80$$

$$x_1 + 2x_2 \geq 60$$

$$x_1, x_2 \geq 0.$$

- (3) Find an optimal solution for given transportation problem :

	<i>D</i> ₁	<i>D</i> ₂	<i>D</i> ₃	<i>D</i> ₄	<i>Supply</i>
<i>S</i> ₁	2	3	11	7	6
<i>S</i> ₂	1	0	6	1	1
<i>S</i> ₃	5	8	15	9	10
<i>Demand</i>	7	5	3	2	

5 Answer the following : (any two)

14

- (1) Explain M/M/1 : ∞ /FIFO queuing model.
- (2) Explain EOQ model with no shortage.
- (3) A project is represented by given activity and task with original schedule time of a completing a project is 40.5 weeks :

Activity	1-2	1-3	1-4	2-5	2-6	3-6	4-7	5-7	6-7
Task	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>	<i>G</i>	<i>H</i>	<i>I</i>
Optimistic time	5	18	26	16	15	6	7	7	3
Pessimistic time	10	22	40	20	25	12	12	9	5
Most Likely time	8	20	33	18	20	9	10	8	4

Determine the following :

1. Expected task times and their variance.
 2. The earliest and latest expected times to reach each event.
 3. The critical path.
- (4) Define following terms :
- (i) Lead time
 - (ii) Stock replenishment time
 - (iii) Planning horizon.