PB-003-1173003   Seat No. _____

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

May / June - 2018

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 Zero sum game.

(ii) Write limitation of Arithmetic Method for solution of 2×2 game.

(iii) Name the types of variables added in LP problem to convert it into Standard form.

(iv) Give second name of Big-M Method.

(v) Name three methods to obtain an initial solution for Transportation Problem.

(vi) When any Transportation problem is said to be Unbalanced?

(vii) Define: Slack variable and Surplus Variable.

(viii) Define Feasible Solution.

(ix) Define Unbounded Solution.

(x) Define Two person game.

2 Answer the following : (Any **Two**)　　　　　　　　　　**14**

    (1) Explain types of failure in Replacement problem.

    (2) Solve given LP problem using Big–M method.

        Min $Z = 600X_1 + 500X_2$

        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 :

	D_1	D_2	D_3	D_4	$Supply$
S_1	2	3	11	7	6
S_2	1	0	6	1	1
S_3	5	8	15	9	10
$Demand$	7	5	3	2	

3 Answer the following :　　　　　　　　　　　　　　　**14**

    (1) Explain strategy in game theory.

    (2) Explain mathematical formulation of LP problem

<div align="center">OR</div>

3 Answer the following :　　　　　　　　　　　　　　　**14**

    (1) Explain steps for PERT and CPM techniques.

    (2) Solve given assignment problem using Hungarian method :

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

4 Answer the following : (Any **Two**)   **14**

   (1) Define following terms:

        (i)   Basic feasible solution

        (ii) Unbounded solution

        (iii) Surplus variable.

   (2) Write a brief note on Simplex Method.

   (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	A	B	C	D	E	F	G	H	I
Optimistic timte	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.

5 Answer the following : (Any **Two**)   **14**

   (1) Define following terms :

        (i)   Lead time

        (ii) Stock replenishment time

        (iii) Planning horizon

   (2) Explain EOQ model with no shortage.

   (3) Solve the following LP problem using graphical method :

        Max $\quad Z = 6x_1 - 4x_2$

        S. to. c $\quad 2x_1 + 4x_2 \le 4$

        $\qquad\qquad 4x_1 + 8x_2 \le 16$

        $\qquad where \ x_1, x_2 \ge 0.$

   (4) Explain $M/M/1 : \infty / FIFO$ queuing model.