YMCA UNIVERSITY OF SCIENCE AND TECHNOLOGY, FARIDABAD
M.Sc. Math EXAMINATION (Under CBCS) , MAy-2018
OPERATIONS RESEARCH (MTH 517)

Time: 3hrs **M.Marks:60**

Note: All the questions in Part-I are compulsory and attempt any four questions form PART-II.

PART -I

Q.1.

I. Explain the phases of OR?
II. What are the advantages of using linear programming problem?
III. What is an infeasible solution and how does it occurs ?
IV. Explain the meaning of basic feasible solution and degenerate solution in linear programming problem.
V. Explain the primal-dual relationship.
VI. How can you maximize the objective function into the assignment problem?
VII. Explain 'minimax criterion' as applied to the theory of the games.
VIII. What are the steps of decision –making process.
IX. Explain the two -person zero-sum game .
X. What are the various assumptions of EOQ formula .

(2×10=20)

PART-II

Q.2(a) Solve the following LPP using Graphical Method:

$$Maximize\ Z = 7x + 3y, subject\ to\ the\ constraints:$$
$$x + 2y \geq 3$$
$$x + y \leq 4$$
$$0 \leq x \leq {}^{5}/_{2}$$
$$0 \leq y \leq {}^{3}/_{2}$$
$$x, y \geq 0$$

(5)

(b) Solve the following LPP using Simplex Method

$$Max.Z = x - y + 3z, subject\ to$$
$$x + y + z \leq 10$$
$$2x - z \leq 2$$
$$2x - 2y + 3z \leq 0$$
$$x, y, z \geq 0$$

(5)

Q.3 (a) Solve the following LPP using Two Phase method:

$$Min.Z = 3x - y - z, subject\ to$$
$$x - 2y + z \leq 11$$
$$-4x + y + 2z \geq 3$$
$$-2x + z = 1$$
$$and\ x, y, z \geq 0$$

(10)

Q.4 (a) State and Prove the Basic Duality theorem . (5)

b) Solve the following cost minimizing assignment problem: (5)

Job→ Typist ↓	P	Q	R	S	T	U
A	80	140	80	100	56	98
B	48	64	94	126	170	100
C	56	80	120	100	70	64
D	99	100	1100	104	80	90
E	64	80	90	60	60	70

Q.5 Find the optimum solution of the following Transportation problem and IBFS by Vogel's approximation method (10)

To → From ↓	W_1	W_2	W_3	W_4	Supply
F_1	2	3	11	7	6
F_2	1	0	6	1	1
F_3	5	8	15	9	10
Demand	7	5	3	2	17

Q.6 (a) What are inventory models? Enumerate various types of inventory models and describe them briefly. (5)

(b) A contractor has to supply 10,000 bearings per day to an automobile manufacturer.He finds that when he starts production run ,he can produce 25,000 bearings per day .The cost of holding a bearing in stock for a year is Rs 200 and the setup cost of a production run is Rs 1,800.How frequently should production run be made ? (5)

Q.7 (a)Describe the maximum principle of game theory .what do you understand by pure strategies and saddle point . (5)

(b) Solve the following games by using maximin(minimax) principle, whose payoff matrix are given below : (5)

(i) strategy selection for each player

(ii) the value of the game to each player .

Does the game have a saddle point ?

Player B

Player A	B_1	B_2	B_3	B_4
A_1	1	7	3	4
A_2	5	6	4	5
A_3	7	2	0	3