

**R09**
**Code No: F3204**
**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**MCA II Semester Examinations, August - 2017**
**OPERATIONS RESEARCH**
**Time: 3hrs**
**Max.Marks:60**

**Answer any five questions**  
**All questions carry equal marks**

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- 1.a) Solve the LPP by Graphical method

Maximize  $z = 3x + 5y$

Such that

$x + 3y \leq 25, 3x + 2y \leq 50$

$5x - 3y \leq 10, x, y \geq 0$

- b) Write about the Phases of Operations research.

[6+6]

2. Solve the following LPP by simplex method.

Maximize  $z = 6x_1 - 2x_2 + 3x_3$  subject to

[12]

$2x_1 - x_2 + 2x_3 \leq 2$

$x_1 + 4x_3 \leq 4$

$x_1, x_2, x_3 \geq 0$

3. Solve the following the transportation problem.

[12]

	D1	D2	D3	D4	D5	Supply
O1	3	4	6	8	9	20
O2	2	10	1	5	8	30
O3	7	11	20	40	3	15
O4	2	1	9	14	16	13
Demand	40	6	8	18	6	Total 78

- 4.a) Formulate assignment model problem mathematically.

- b) Explain Hungarian method for optimal solution with an example.

[6+6]

5. Obtain the optimum sequencing by using Johnson's Rule.

There are 5 jobs, each of which must go through the machines A,B, and C in the order ABC Jobs Also find the total elapsed time T and the idle time on each machine.

[12]

Processing time $A_i$	5	7	6	9	5
Processing time $B_i$	2	1	4	5	3
Processing time $C_i$	3	7	5	6	7

6. A truck owner finds from his past records that the maintenance costs per year of a truck whose purchase price is Rs 8000 are given below

Year	1	2	3	4	5	6	7	8
Maintenance cost ( $R_n$ )	1000	1300	1700	2200	2900	3800	4800	6000
Resale price ( $S_n$ )	4000	2000	1200	600	500	400	400	400

Determine at which time it is profitable to be replaced.

[12]

- 7.a) Two players A and B match the coins. If the coins match A wins 1 unit of value. If coins do not match B wins 1 unit of value. Determine the pay off matrix, the best strategies for each player and the value of the game.
- b) Solve the following game by Dominance method.

[6+6]

4	4	2	-4	-6
8	6	8	-4	0
10	2	4	10	12

8. A stockist has to supply 400 units of a product every Monday to his customers. He gets the product at Rs.50 per unit from the manufacturer. The cost of ordering and transportation from the manufacturer is Rs.75 per order. The cost of carrying inventory is 7.5% per year of the cost of the product. Find:

a) The economic lot size.

b) The total optimal cost (including the capital cost).

[6+6]

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