

Code No: 57022

R09

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November - 2015

OPERATIONS RESEARCH

(Common to ME, MCT, AME, MSNT)

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks

1. a) Explain the general methods for solving the Operation Research Models.
b) Solve the following Linear Programming Problem by two-phase method:

[5+10]

$$\text{Maximize } Z = 3X_1 - X_2$$

$$\text{Subject to: } 2X_1 + X_2 \geq 2$$

$$X_1 + 3X_2 \leq 2$$

$$X_2 \leq 4$$

$$\text{and } X_1, X_2 \geq 0.$$

2. a) Solve the following Assignment Problem.

| T | MEN | | | | | |
|---|-----|---|---|---|---|---|
| | A | 1 | 3 | 2 | 8 | 8 |
| A | B | 2 | 4 | 3 | 1 | 5 |
| S | C | 5 | 6 | 3 | 4 | 6 |
| K | D | 3 | 1 | 4 | 2 | 2 |
| S | E | 1 | 5 | 6 | 5 | 4 |

- b) Write an algorithm for solving Transportation problem. [7+8]
3. a) We have seven jobs each of which has to go through the machine A & B in the order A, B. Processing times (in Hours) are given as:

| Job | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|---|----|----|---|----|----|---|
| Machine A | 3 | 12 | 15 | 6 | 10 | 11 | 9 |
| Machine B | 8 | 10 | 10 | 6 | 12 | 1 | 3 |

Determine a sequence of these jobs that will minimize the total elapsed time T.

- b) The cost of a machine is Rs.6,100 and its scrap value is only Rs.100. The maintenance costs are found from experience to be:

| | | | | | | | | | |
|-------------------------|---|-----|-----|-----|-----|-----|------|------|------|
| Year | : | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Maintenance Cost in Rs. | : | 100 | 250 | 400 | 600 | 900 | 1250 | 1600 | 2000 |

When should machine be replaced? [7+8]