

Code No: **R31032** 





## **III B.Tech I Semester Supplementary Examinations, May-2017 OPERATIONS RESEARCH**

(Mechanical Engineering)

**Time: 3 hours** 

Max. Marks: 75

## **Answer any FIVE Questions**

## All Questions carry equal marks

\*\*\*\*

- 1 Maximize Z=5x1-4x2+3x3 Subject to  $2x_1+x_2-6x_3=20$  $6x_1 + 5x_2 + 10x_3 \le 76$  $8x_1 - 3x_2 + 6x_3 \le 50$  $x_1, x_2, x_3 \ge 0$
- 2 A production cycle involves the manufacturing of 5 products namely, A, B, C, D and E. The set-up costs (in Rupees) are given below:

То

|      |   | Α | В   | C C | D | Е |
|------|---|---|-----|-----|---|---|
| From | Α |   | 7 0 | 6   | 8 | 4 |
|      | В | 7 |     | 8   | 5 | 6 |
|      | С | 6 | 8   |     | 9 | 7 |
|      | D | 8 | 5   | 9   |   | 8 |
|      | Ε | 4 | 6   | 7   | 8 |   |

Find the optimal setup cost and its corresponding cycle.

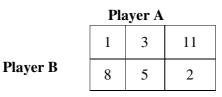
3

A machine costs Rs.10, 000/-. Its operating cost and resale values are given below: 1.

| Year               | 1    | 2    | 3    | 4    | 5    | 6    | 7    |
|--------------------|------|------|------|------|------|------|------|
| Operati<br>ng cost | 1000 | 1200 | 1400 | 1700 | 2000 | 2500 | 3000 |
| Resale<br>value    | 6000 | 4000 | 3200 | 2600 | 2500 | 2400 | 2000 |

Determine at what time it could be replaced?

4 Solve the following 2 x 3 game graphically.





## Code No: **R31032**

**R10** 

Set No. 1

- 5 a) Explain briefly the characteristics of a queuing system.
  - b) A TV repairman finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they come in, and if the arrival of sets is approximately Poison with an average rate of 10 per 8 hour day, what is repairman's expected idle time each day? How many jobs are ahead of the average set just brought in?
- 6 Find the optimal economic order quantity for a product having the following characteristics: Annual demand=2400 unit Ordering cost=Rs.100 Cost of storage=24% of unit cost

| Price break quantity | Unit cost (Rs) |  |  |
|----------------------|----------------|--|--|
| $0 \le q \le 500$    | 10.00          |  |  |
| $q \ge 500$          | 9.00           |  |  |

- 7 a) What are the demerits of dynamic programming?
  - What are the pre-requisites for applying dynamic programming? b)
- 8 a) What do you understand by simulation? Explain briefly its advantages and disadvantages.
  - b)

disadvantages. Discuss the types of simulation models. \*\*\*\*\* 2 of 2