

Code No: **R42243**

# R10

**Set No. 1**
**IV B.Tech II Semester Supplementary Examinations, April - 2018**
**OPERATION RESEARCH**
**(Automobile Engineering)**
**Time: 3 hours**
**Max. Marks: 75**
**Answer any FIVE Questions**  
**All Questions carry equal marks**

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- 1 a) Write the classification of OR models. [8]  
 b) A company produces 2 types of hats. Every hat A require twice as much labour time as the second hat B. If the company produces only hat B then it can produce a total of 500 hats a day. The market limits daily sales of the hat A and hat B to 150 and 250 hats. The profits on hat A and hat B are Rs.8 and Rs.5 respectively. Solve using Simplex method to get the optimal solution. [7]

- 2 A marketing manager has 5 salesmen and there are 5 sales districts. Considering the capabilities of the salesmen and the nature of districts, the estimates made by the marketing manager for the sales per month (in 1000 rupees) for each salesmen in each district would be as follows.

|   | A  | B  | C  | D  | E  |
|---|----|----|----|----|----|
| 1 | 32 | 38 | 40 | 28 | 40 |
| 2 | 40 | 24 | 28 | 21 | 36 |
| 3 | 41 | 27 | 33 | 30 | 37 |
| 4 | 22 | 38 | 41 | 36 | 36 |
| 5 | 29 | 33 | 40 | 35 | 39 |

Find the assignment of salesmen to the districts that will result in the maximum sales. [15]

- 3 The following failure rates have been observed for a certain type of light bulb.

| End of week                 | 1    | 2    | 3    | 4    | 5    | 6    | 7    |
|-----------------------------|------|------|------|------|------|------|------|
| Probability failure to date | 0.05 | 0.15 | 0.25 | 0.46 | 0.68 | 0.88 | 1.00 |

The replacement of an individual bulb on failure cost Rs 1.25. The cost of group replacement is 80 paise per bulb. Determine the better one among the individual and group replacement policies. [15]

- 4 Using the principle of dominance, solve the following game.

Player B

Player A

|   | 3  | -2 | 4 |
|---|----|----|---|
| 3 | -1 | 4  | 2 |
| 2 | 2  | 2  | 6 |

[15]

- 5 a) Explain briefly the main characteristics of a queueing system [8]  
 b) Describe the fundamental components of a queueing process and give suitable examples. [7]

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- 6 Discuss the probabilistic inventory model with instantaneous demand and no-setup cost. [15]
- 7 Maximize  $z = 4x_1 + 14x_2$   
Subject to  
 $2x_1 + 7x_2 \leq 21$   
 $7x_1 + 2x_2 \leq 21$   
 $x_1, x_2 \geq 0$  [15]
- 8 Discuss simulation techniques with suitable examples. What are their advantages and disadvantages? [15]

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