

## Seventh Semester B.E. Degree Examination, Aug./Sept.2020 Operation Research

Time: 3 hrs.

Max. Marks:100

Note: i) Answer any FIVE full questions, selecting atleast TWO questions from each part. ii) Use of Normal distribution table is permitted.

PART - A

a. Define Operations Research? Explain main characteristics of Operations Research.

(08 Marks)

b. Explain in detail applications of operations research in the management.

(06 Marks)

c. Describe the phases of scientific method in operations research.

(06 Marks)

- 2 a. What is linear programming? What are its major assumptions and limitations? (06 Marks)
  - b. Use the penality (Big-M) method to solve the following linear programming problem. Minimize  $Z = 5x_1 + 3x_2$

Subject to constraints  $2x_1 + 4x_2 \le 12$ 

$$2x_1 + 2x_2 > 10$$

$$5x_1 + 2x_2 \ge 10$$

and 
$$x_1, x_2 \ge 0$$
.

(14 Marks)

Find the optimal solution by solving dual of the following LPP:

 $Minimize Z = x_1 + x_2 + x_3$ 

Subject to

$$x_1 - 3x_2 + 4x_3 = 5$$

$$x_1 - 2x_2 \le 3$$

$$2x_2 - 1x_3 \ge 4$$

$$x_1, x_2 \ge 0$$

 $x_3$  – unrestricted in sign.

(20 Marks)

4 a. Explain the procedure for Dual Simplex method.

(08 Marks)

b. What are the different Artificial Variable Techniques available to solve LPP problem and explain the procedure of Big – M method. (12 Marks)

PART - B

- 5 With describing the Notation used, explain the steady state analysis of M/M/1 queuing model.
  (20 Marks)
- 6 a. Describe the procedure for performing estimation of times.

(10 Marks)

- b. Define the following: i) Head event stock ii) Tail event stock iii) Earliest finish time iv) Total float v) Independent float. (10 Marks)
- 7 a. Explain application areas of CPM techniques?

(07 Marks)

b. Mention the uses of CPM for management.

(07 Marks)

c. What are the disadvantages of network techniques?

(06 Marks)

- 8 a. With reference to game theory explain the following terms: i)Saddle point ii) pure strategy iii) dominance rule iv) game value v) mixed strategy vi) 2-person zero sum game.(12 Marks)
  - b. In a game of matching coins with two players, suppose player A wins one unit of value when there are two heads, wins nothing when there are two tails and loses half unit of value when there are one head and one tail. Prepare the payoff matrix find the best strategies for each player and value of the game.

    (08 Marks)