



DG-3182
Third Year B. Sc. (Computer Science)
(Sem. V) Examination
March / April - 2016
Generic Elective (IDS) : 507 - 2
Operation Research

Time : 3 Hours]

[Total Marks : 70

Instructions :

(1)

| | |
|---|--|
| <p>नीचे दृष्टावेव निशानीवाणी विगतो उत्तरवडी पर अवश्य लखवी. Fillup strictly the details of signs on your answer book.</p> <p>Name of the Examination : Third Year B. Sc. (Computer Science) (Sem. 5)</p> <p>Name of the Subject : Generic Elective (IDS) : 507-2</p> <p>Subject Code No. : 3 1 8 2 Section No. (1, 2,.....): Nil</p> | <p>Seat No. : <input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/><input type="text"/></p> <div style="border: 1px solid black; border-radius: 15px; height: 80px; display: flex; align-items: center; justify-content: center; margin-top: 10px;">Student's Signature</div> |
|---|--|

(2) All questions carry 14 marks.

(3) Non-programmable scientific calculator is allowed.

1 Answer as directed : 14

- (1) What is basic feasible solution ? List types of basic feasible solution.
- (2) What is the difference between assignment and transportation problem?
- (3) Define slack and surplus variable.
- (4) Write a mathematical form of LPP.
- (5) Define slack and surplus variable.
- (6) Define competitive game.
- (7) Explain Maximin and Minimax principle.

2 Solve the following. 14

(1) Solve the following LPP using Simplex method:

$$\text{Max } Z = 7x_1 + 5x_2 \quad \text{subject to}$$

$$-x_1 - 2x_2 \geq -6$$

$$4x_1 + 3x_2 \leq 12$$

$$x_1, x_2 \geq 0$$

- (2) A toy company manufactures two types of dolls, a basic version - doll A and a deluxe version - doll B. Each doll of type B takes twice as long to produce as one of type A, and the company would have time to make maximum of 2000 per day. The supply of plastic is sufficient to produce 1500 dolls per day (both A and B combined). The deluxe version requires a fancy dress of which there are only 600 per day available. If the company makes a profit of Rs. 3.00 and Rs.5.00 per doll, respectively on doll A and B, then how many of each doll should be produced per day in order to maximize the total profit. Formulate this problem as LPP.

OR

- (2) Solve the following LPP using graphical method:

$$\text{Max } Z = 3x_1 + 5x_2 \quad \text{subject to}$$

$$x_1 + 2x_2 \leq 2000,$$

$$x_1 + x_2 \leq 1500,$$

$$x_2 \leq 600 \quad \text{and} \quad x_1 > 0, x_2 > 0.$$

3 Solve the following.

14

- (1) Solve the following LPP using Graphical Method.

$$\text{Max } Z = 0.50x_2 - 0.10x_1 \quad \text{subject to}$$

$$2x_1 + 5x_2 \leq 80,$$

$$x_1 + x_2 \leq 20, \quad \text{and} \quad x_1, x_2 \geq 0.$$

- (2) Solve the following LPP using simplex method.

$$\text{Max } Z = 5x_1 + 3x_2 \quad \text{subject to}$$

$$3x_1 + 5x_2 \leq 15,$$

$$5x_1 + 2x_2 \leq 10,$$

$$x_1, x_2 \geq 0,$$

OR

- (2) Solve the following assignment problem optimally:

| | I | II | III | IV | V | VI |
|---|----|----|-----|----|-----|----|
| A | 20 | 23 | 18 | 10 | 16 | 20 |
| B | 50 | 20 | 17 | 16 | 15 | 11 |
| C | 60 | 30 | 40 | 55 | 8 | 7 |
| D | 6 | 7 | 10 | 20 | 100 | 9 |
| E | 18 | 19 | 28 | 17 | 60 | 70 |
| F | 9 | 10 | 20 | 30 | 40 | 50 |

4 Solve the following.

14

(1) Solve the following assignment problem optimally:

Machines

| | | | | | | |
|------------|---|----|----|----|----|----|
| | | 1 | 2 | 3 | 4 | 5 |
| Job | A | 11 | 17 | 8 | 16 | 20 |
| | B | 9 | 7 | 12 | 6 | 15 |
| | C | 13 | 16 | 15 | 12 | 16 |
| | D | 21 | 24 | 17 | 28 | 26 |
| | E | 14 | 10 | 12 | 11 | 15 |

(2) An oil corporation has got three refineries P, Q and R. and it has to send petrol to four different depots A, B, C and D, The cost of shipping 1 gal. of petrol and the available petrol at the refineries are given in the table. The requirement of the depots and the available petrol at the refineries are also given. Find the minimum cost of shipping after obtaining an initial solution by VAM.

| | | | | | |
|----------|----|-----|-----|-----|-----------|
| | D1 | D2 | D3 | D4 | Available |
| P | 10 | 12 | 15 | 8 | 130 |
| Q | 11 | 11 | 9 | 10 | 150 |
| R | 20 | 9 | 7 | 18 | 170 |
| Required | 90 | 100 | 140 | 120 | |

OR

(2) The figures in the body of the table below are proportional to the cost of transportation of the tone of food grain from the port given by the row heading to the destination given by column heading.

| | | | | | |
|----------|-------|-----------|--------|--------|-----------|
| | Delhi | Hyderabad | Mysore | Nagpur | Available |
| Bombay | 9 | 5 | 8 | 5 | 225 |
| Calcutta | 9 | 10 | 13 | 7 | 75 |
| Madras | 14 | 5 | 3 | 7 | 100 |
| Required | 125 | 80 | 95 | 100 | |

Plan a transportation scheme satisfying the requirements of each destination and at a same time minimizing the total transportation cost.

5 Solve the following.

14

- (1) Solve the following game. Find the saddle point of pay of matrix and find the value of the game. Also check the game is fair or not.

| | I | II | III | IV | V |
|-----|---|----|-----|----|---|
| I | 9 | 3 | 1 | 8 | 0 |
| II | 6 | 5 | 4 | 6 | 7 |
| III | 5 | 4 | 4 | 3 | 8 |
| IV | 2 | 6 | 2 | 2 | 1 |

- (2) Solve the following game using dominance principle.

Player B

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| A | 2 | 4 | 3 | 8 | 4 |
| B | 5 | 6 | 3 | 7 | 8 |
| C | 6 | 7 | 9 | 8 | 7 |
| D | 4 | 2 | 8 | 4 | 3 |

OR

- (2) Answer the following.
- Define Strategy. Discuss different types of strategies
 - Define zero sum game & fair game.