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14 (COM-2) 2·8 N/O

2016

**OPERATIONS RESEARCH AND
COMPUTER IN BUSINESS**

Paper : 2·8

Full Marks : 80

Time : Three hours

**The figures in the margin indicate
full marks for the questions.**

Write answers to the **two Groups** in
separate books.

GROUP-A

(Operations Research)

N.B. : While **New Course** students will have to answer question no. **4. (b)**, **Old Course** students will have to answer question no. **4. (c)** in lieu of **4. (b)**. All other questions are **common** to the students of both the courses **New & Old**.

1. (a) State whether the following statement is true **or** false :

“Linear programming deals with problems involving a single objective.”

1

Contd.

(b) Choose the correct alternative :

The solution to a transportation problem with 4 sources and 5 destinations is a basic feasible solution if the number of positive allocations is :

(i) 10

(ii) 9

(iii) 20

(iv) 8

1

(c) Point out a basic difference between a transportation problem and an assignment problem.

1

(d) Choose the correct alternative.

In LPPs, constraints may represent

(i) limitations

(ii) requirements

(iii) balance conditions

(iv) all in (i), (ii) and (iii)

1

(e) What is a saddle point associated with game theory?

1

2. (a) Write a note on the origin and development of Operations Research.

5

(b) Explain with the help of an example the problem of infeasible solution associated with linear programming.

5

Or

Write a note on game theory.

(c) Explain the assignment problem giving its mathematical formulation.

5

3. (a) Solve the following LPP by graphical method :

$$\text{Maximize } Z = 8x + 5y$$

Subject to the constraints :

$$x \leq 150$$

$$y \leq 250$$

$$2x + y \leq 500$$

$$x, y \geq 0$$

6

(b) Solve the following LPP by simplex method :

$$\text{Maximize } Z = 4x_1 + 3x_2$$

Subject to the constraints :

$$x_1 + x_2 \leq 50$$

$$x_1 + 2x_2 \leq 80$$

$$3x_1 + 2x_2 \leq 140$$

$$x_1, x_2 \geq 0$$

9

Or

Use two-phase simplex method to solve the following LPP :

$$\text{Minimize } Z = \frac{15}{2}x_1 - 3x_2$$

Subject to the constraints :

$$3x_1 - x_2 - x_3 \geq 3$$

$$x_1 - x_2 + x_3 \geq 2$$

$$x_1, x_2, x_3 \geq 0$$

4. (a) Find the initial basic feasible solution to the following transportation problem by Vogel's Approximation Method (Unit Cost-penalty Method) :

		TO			
		W_1	W_2	W_3	Supply
From	F_1	2	7	4	5
	F_2	3	3	1	8
	F_3	5	4	7	7
	F_4	1	6	2	14
Demand		7	9	18	34

8

Or

Solve the game whose pay-off matrix is :

		Player B		
		I	II	III
Player A	I	-1	-2	8
	II	7	5	-1
	III	6	0	12

(b) **[For New Course]**

A bank plans to open a single server drive-in banking facility at a particular centre. It is estimated that 28 customers will arrive each hour on an average. If, on an average, it requires 2 minutes to process a customer's transaction, determine :

- (i) the proportion of time the system will be idle.
- (ii) on the average, how long a customer will have to wait before reaching the server?
- (iii) the length of the driveway required to accommodate all the arrivals, on the average, if 20 feet of driveway is required for each car that is waiting for service. $2+2+3=7$

(c) **[For Old Course]**

Explain the net present value method of investment analysis. 7

GROUP-B

(Computer in Business)

(For both New Course and Old Course)

Marks : 30

5. (a) Define an information system. 1
(b) What is encryption? 1
(c) Define the four DFD symbols. 2
(d) What do you mean by data flow diagrams? 1
6. (a) Explain the private and public key encryption techniques. 5

Or

Write about the basic characteristics present in all information systems.

- (b) What is e-commerce? Write a brief note on the benefits of e-commerce.

2+3=5

7. (a) What is system development life cycle? Describe the classical waterfall model.
3+5=8

Or

What is a decision tree? Explain the technique of preparing a decision tree with a suitable example. $3+5=8$

(b) What do you mean by input design? Discuss the different ways of inserting source data into the system. $2+5=7$