H

Roll No. .....

TBC–503

B. C. A. (FIFTH SEMESTER)
MID SEMESTER
EXAMINATION, Oct., 2023
OPTIMIZATION TECHNIQUES

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) What do you mean by optimization techniques ? Describe various features of operations research. (CO1)

OR

(b) Describe the methodology of solving operations research problems by defining each step using suitable example. (CO1)

P. T. O.

2. (a) Discuss *five* different operations research models in real life. (CO1)

OR

(b) Discuss the *three* different phases of operations research approach to problem solving. (CO1)

3. (a) Discuss *two* applications of Operations Research in detail by describing the problems and nature of solution through Operations Research. Also discuss the role of computers in Operations Research. (CO1)

OR

(b) An electric company produces two products P1 and P2. Products are produced and sold on a weekly basis. The weekly production cannot exceed 25 for product P1 and 35 for product P2 because of limited available facilities. The company can employes maximum of 60 workers. Product P1 requires 2 man per week of

labour, while P2 requires one man per week of labour. Profit margin on P1 is ₹ 60 and profit margin on P2 is ₹ 40. Formulate this problem as an LP problem and solve that using graphical method. (CO2)

4. (a) Solve the following LPP using simplex method : (CO2)

Maximize :

$$Z = 4x_1 + 10x_2$$

Subject to the constraints :

$$2x_1 + x_2 \leq 50$$

$$2x_1 + 5x_2 \leq 100$$

$$2x_1 + 3x_2 \leq 90$$

$$x_1, x_2 \geq 0.$$

OR

(b) Solve the following LPP using Big M method : (CO2)

Maximize :

$$Z = 3x_1 + 2x_2$$

Subject to the constraints :

$$2x_1 + x_2 \leq 2$$

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

$$x_1, x_2 \geq 0$$

5. (a) Find initial basic feasible solution of the following transportation problem using Vogel's approximation method : (CO2)

		Warehouse				
		W_1	W_2	W_3	W_4	Supply
Factory	F_1	19	30	50	10	7
	F_2	70	30	40	60	9
	F_3	40	8	70	20	18
Demand		5	8	7	14	34

OR

(b) A project has four subtasks. Each subtask has to be performed by a student. The following table shows the time taken (in hours) by different students for different subtasks. How the sutasks should be

allocated to the students to minimize the total hours : (CO2)

		Student			
		S_1	S_2	S_3	S_4
Subtasks	A	8	26	17	11
	B	13	28	4	26
	C	38	19	18	15
	D	19	26	24	10