Course Code: 23HM4T03

BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE

(AUTONOMOUS)

II - B.Tech II-Semester Regular Examinations (BR23), Apr/May - 2025

OPTIMIZATION TECHNIQUES (CSE-AI&DS, AI&ML)

Time: 3 hours Max. Marks: 70

Question Paper consists of Part-A and Part-B

*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	State the necessary condition for a point to be an optimum in unconstrained optimization.	(2M)	CO1	BL1
b)	Determine the extreme points of the function $f(x) = x^2 - 4x + 5$	(2M)	CO1	BL3
c)	What are the basic characteristics of a linear programming problem?	(2M)	CO2	BL1
d)	Write the working rule of the graphical method.	(2M)	CO2	BL1
e)	What do you understand about transportation problem?	(2M)	CO3	BL1
f)	Define the Basic Feasible Solution of the transportation problem.	(2M)	CO3	BL1
g)	What is the Non-Linear programming problem?	(2M)	CO4	BL1
h)	What are the classifications of unconstrained optimization problem?	(2M)	CO4	BL1
i)	Give an example of a multistage decision process.	(2M)	CO5	BL2
j)	State the principle of optimality in Dynamic Programming	(2M)	CO5	BL1

PART–B (5X10 = 50M)

2	Write the statement of optimization problem and their classifications.	10(M)	CO1	BL1
	(OR)			
3	Write a short note on (i) Solution by method Lagrange multipliers. (ii)Multi variable optimisation with inequality constraints.	10(M)	CO1	BL1
4.	Solve the following LPP by Simplex method $Max\ Z = 5x_1 + 3x_2$ Subject to constraints $3x_1 + 5x_2 \leq 15 \quad 5x_1 + 2x_2 \leq 10 \quad x_1, x_2 \geq 0$	10(M)	CO2	BL3
	(OR)			
5	Solve the following LPP by simplex method $Max\ z = 3x_1 + 2x_2 - 2x_3$ Subject to constraints $x_1 + 2x_2 + 2x_3 \leq 10 \quad 2x_1 + 4x_2 + 3x_3 \leq 15$ $\& \ x_1, x_2, x_3 \geq 0$	10(M)	CO2	BL3

6	Find the optimum basic solution of the following transportation problem.						10(M)	CO3	BL3

	M1	M2	M3	M4	M5	SUPPLY
F1	2	11	10	3	7	4
F2	1	4	7	2	1	8
F3	3	9	4	8	12	9
DEMAND	3	3	4	5	6	

(OR)

7	Explain about the North-West corner rule method and the Least cost method.	10(M)	CO3	BL2
8	Explain the penalty method for constrained non-linear optimization.	10(M)	CO4	BL2

(OR)

9	Use the Steepest-Descent method to minimize the function $f(x_1, x_2) = 4x_1^2 + 6x_2^2 - 8x_1x_2$ starting from the point $X_1 = \{1,1\}^T$.	10(M)	CO4	BL3
10	What is dynamic Programming? Explain the advantages and disadvantages of dynamic Programming problems.	10(M)	CO5	BL2

(OR)

11	Write a short note on (i) the Principle of Optimality (ii) Computational procedure of dynamic programming problem.	10(M)	CO5	BL1

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