JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, March - 2021
OPTIMIZATION TECHNIQUES
(Common to EEE, ECE)

Time: 2 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks
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1. What are the different types of optimization problems? Explain each with the help of suitable objective function and constraints. [15]

2. State and explain the necessary and sufficient conditions for existence of relative optima in case of multivariable optimization with constraints. [15]

3. Write the standard form of the following LPP

    Max $Z = X_1 - X_2 - 2X_3$
    Subject to $X_1 + X_2 + X_3 \leq 15$
    $2X_1 - X_2 + X_3 \leq -10$
    $X_1 + 2X_3 = 10$
    $X_1, X_2 \geq 0$ and X_3 is unrestricted in sign. [15]

4. Find the basic feasible solution with cost using Vogel's approximation method.   [15]

	D1	D2	D3	D4	supply
O1	1	2	-2	3	70
O2	2	4	0	1	38
O3	1	2	-2	5	32
Demand	40	28	30	32	

5. Minimize $f(x) = f(x_1, x_2) = 2X_1^2 + 3X_2^2 - X_1X_2$ using the univariate method taking

    $X1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ [15]

6. Minimize $f(x_1, x_2) = x_1^2 - 2x_1 + 1 + x_2^2$ using the steepest descent method. Take starting point $(0, 0)^T$. [15]

7. Solve the following problem by using interior penalty function approach.
    Minimize $f(x_1, x_2) = 6(x_1)^2 + 4x_1x_2 + 3x_2^2$
    Subject to: $x_1 + x_2 - 5 = 0$ [15]

8.a) State the Bellman's principle of optimality.
  b) Explain its application in multi-stage decision process with suitable example. [15]

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