Code No: 5215AZ

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M. Tech II Semester Examinations, July/August - 2021
ADVANCED OPTIMIZATION TECHNIQUES AND APPLICATIONS
(Machine Design)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

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1. Find the minimum of the function $f(x)=0.65-(0.75/(1+x^2))-0.65x\tan^{-1}(1/x)$ using the Quadratic interpolation method with an initial step size of 0.1. [15]

2. Develop and explain about an Unconstrained Geometric Programming problem using Arithmetic-Geometric in equality? [15]

3. Solve the following problem by dynamic programming:
Maximize $Z = 28x_1 + 7x_2$
Subject to $4x_1 + 3x_2 \le 12$
$2x_1 + 5x_2 \le 10$
$x_1, x_2 \ge 0$. [15]

4. Max $Z= 5\,x_1+12\,x_2+4x_3$
Subjected to
$x_1+2\,x_2+x_3 \le 5$
$2\,x_1-x_2+3x_3=2$
Solve the L.P.P and find the effect of changing from $\begin{bmatrix}5\\2\end{bmatrix}$ to $\begin{bmatrix}3\\10\end{bmatrix}$ by using sensitivity analysis. [15]

5. By using Gomory's cutting plane method, solve the following problem.
Minimize $f = -3x_1-4x_2$
Subject to $3x_1-x_2+x_3=12$
$3x_1+11x_2+x_4=66$
$x_i \ge 0$, $i=1$ to 4, all x_i are integers. [15]

6.a) Why is Rosen Brock's search method called the method of rotating coordinates?
b) Minimize $f = 2x_1^2 + x_2^2$ from the starting point (1, 2) using the Univariate method (Two iterations only). [5+10]