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Total No. of Pages : 01

Total No. of Questions : 08

M.Tech (Microelectronics) (Sem.-1)
ADVANCED MATHEMATICS FOR ENGINEERS

Subject Code : ME-807

M.Code : 38407

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) Find the Fourier sine and cosine transforms of $f(x) = e^{-ax}$. (10)
 b) State and prove change of scale property of Fourier transforms. (10)
2. (a) Find the Z-transform of $c^k \cos \alpha k, k \geq 0$. (10)
 b) If $Z(f(k)) = F(z)$ then show that $Z(kf(k)) = z \frac{d}{dz} F(z)$. (10)
3. Apply Crout's method to solve the equations
 $3x + 2y + 7z = 4; 2x + 3y + z = 5; 3x + 4y + z = 7$ (20)
4. Find the bilinear transformation which maps the points $z = 1, i, -1$ into the points $w = i, 0, -i$. Hence, find the image of $|z| < 1$. (20)
5. Define Euler's equation and prove that the shortest distance between two points in a plane is a straight line. (20)
6. Define convolution of two functions $f(x)$ and $g(x)$. State and prove convolution theorem on Fourier transforms. (20)
7. Determine the largest eigen value and the corresponding eigen vector of the matrix. (20)

$$A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

8. Discuss Hamilton's principle and derive Lagrange's equation. (20)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.