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Total No. of Pages: 01

Total No. of Questions: 08

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

Subject Code: EC-501

Paper ID: [E0561]

Time: 3 Hrs.

Max. Marks: 100

INSTRUCTIONS TO CANDIDATE:*Attempt any five questions out of eight questions**Each question carry twenty marks.*

Q. 1. Prove that $\int_0^{\infty} \frac{(x \cos x - \sin x)^2}{x^6} dx = \frac{\pi}{15}$.

Q. 2. (a) Find the inverse z-Transform of $\frac{4z^2 - 2z}{z^3 - 5z^2 + 8z - 4}$.

(b) Find the $Z^{-1} \{(z-5)^{-3}\}$ when $|z| > 5$.

Q. 3. (a) Find the Bilinear transformation that maps the point 0, 1, i in z- plane onto the points 1+i, -i, 2-i in the w-plane.

(b) Find the image of triangular region with vertices at (0, 0), (1, 0), (0, 1) under the transformation $w = (1-i)z + 3$.

Q. 4. (a) Solve by Jacobi's iteration method the equations
 $20x + y - 2z = 17$; $3x + 20y - z = -18$; $2x - 3y + 20z = 25$.

(b) Apply Crout's method to solve the equations
 $3x + 2y + 7z = 4$; $2x + 3y + z = 5$; $3x + 4y + z = 7$.

Q. 5. (a) Apply Gauss elimination method to solve the equation
 $X + 4y - z = -5$; $x + y - 6z = -12$; $3x - y - z = 4$.

(b) Explain the procedure to find the largest Eigen value of the Matrix by any iterative method.

Q. 6. (a) State and prove Convolution Theorem for Fourier Transformation.

(b) Find the inverse Fourier sine transform of $\frac{e^{-as}}{s}$.

Q. 7. Prove that shortest distance between any two points in a plane is a straight line.

Q. 8. State and prove "The Brachistochrone Problem".

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