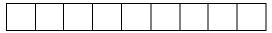
CE/CH/CS/EC/EE/EI/IT/ME 211 14MA301

Hall Ticket Number:



November, 2019 Third Semester

Common to All Branches Engineering Mathematics-III

Time: Three Hours	Maximum: 60 Marks
Answer Question No. I compulsorily.	(1X12 = 12 Marks)
Answer ONE question from each unit.	(4X12=48 Marks)
Answer all questions	(1X12=12 Marks)
a) Write Fourier Integral Theorem	
b) Find f(x), if the Fourier Sine transform of $f(x) = \frac{1 - \cos n\pi}{n^2 \pi^2}$, $(0 \le x \le \pi)$	

- c) Define Convolution of two functions.
- d) Solve $u_{xy} = u_y$
- e) Write the solution of Wave equation
- f) Write the solution of Laplace equation.
- g) State Newton's divided difference formula
- h) Write Lagrange's Inverse Interpolation formula.
- i) Write the iterative formula for \sqrt{N} using Newton-Raphson method.
- j) Reduce $A = \begin{bmatrix} 8 & 5 \\ 2 & 3 \end{bmatrix}$ as LU-factorization
- k) Explain Euler's method.
- I) State Poisson's equation.

UNIT I

2 a) Write the Fourier integral representation for
$$f(x) = \begin{cases} 1 - x^2, for |x| \le 1 \\ 0, for |x| > 1 \end{cases}$$
 6M

b) Find the Fourier transform of $e^{-a^2x^2}$, a < 0. Hence write Fourier transform of $e^{-x^2/2}$ is Self reciprocal

(OR)

- 3 a) Express the function $f(x) = \begin{cases} 1 x^2, for |x| \le 1\\ 0, for |x| > 1 \end{cases}$ as Fourier integral. 6M
 - b) Find the Fourier Sine and Cosine transforms of e^{-ax}

UNIT II

- 4 a) Solve $y^2 u_{yy} + 2y u_y 2u = 0$
 - b) Find the deflection of a vibrating string of unit length having fixed ends with initial velocity 6M zero and initial deflection f(x) = k(sinx sin2x).

(OR)

5 a) Find the temperature distribution in the rod at time t, if the ends A and B of a rod 20cm long 6M have the temperature at $30^{\circ}c$ and $80^{\circ}c$ until steady state prevails. The temperature of the ends are changed to $40^{\circ}c$ and $60^{\circ}c$ respectively. Find the temperature distribution in the rod at time t.

b) Solve the Laplace equation
$$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$$
 subject to the conditions $u(0,y) = u(l,y) = u(x,0) = 0$ and $u(x,a) = \sin \frac{n\pi x}{l}$

6M

6M

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UNIT III

		UNIT III	
6	a)	Find by Newton's Method, the real root of the equation $3x = cosx + 1$	6M
	b)	The area A of a circle of diameter d is given for the following values	6M
		d 80 85 90 95 100 A 5026 5674 6362 7088 7854	
		Calculate the area of a circle of diameter 105. (OR)	
7	a)	Use Lagrange's formula to find the form of $f(x)$, given	6M
		x0236f(x)648704729792	
	b)	Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by applying (i) Trapezoidal rule, (ii) Simpson's rule.	6M
		11N117P 187	
8	a)	UNIT IV Apply Gauss-Seidel Iterative method to solve 2x + y + 6z = 9, 8x + 3y + 2z = 13, x + 5y + z = 7.	6M
	b)	Using Cholesky's method solve 10x + y + z = 12, 2x + 10y + z = 13, 2x + 2y + 10z = 104.	6M

(OR)

9 a) Apply Runga-Kutta forth order, Solve $\frac{dy}{dx} = x + y$ with y(0) = 1 at x = 0.2 6M

b) Solve the partial differential equation $\nabla^2 u = -10(x^2 + y^2 + 10)$ over the square with sides 6M x = 0 = y, x = 3 = y with u = 0 on the boundary and mesh length 1.