$\boxed{\text{R16}}$

$\boxed{\text{SET - 1}}$

I B. Tech II Semester Supplementary Examinations, November - 2021
MATHEMATICS-II (MM)
(Com to AE, AME, Bio Tech, Chem. E, CE, EEE, ME, Metal E, Min E,PCE,PE)
Time: 3 hours   Max. Marks: 70

Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)
2. Answering **ALL** the questions in **Part-A** is Compulsory
3. Answer any **FOUR** Questions from **Part-B**
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PART –A

1. a) Define algebraic equation with an example.   (2M)

    b) Prove that $\mu\delta = \frac{1}{2}[\Delta + \nabla]$ (2M)

    c) Find y(0.1) By Euler's method Given that $\frac{dy}{dx} = x^2 + y^2, y(0) = 1$ (2M)

    d) Find half range sine series of $f(x) = \frac{x}{4}$ in $[0,1\pi]$ (2M)

    e) Find the inverse Fourier finite sine transform of f(x) if   (2M)

    $$F_S(n) = \frac{\cos\left(\frac{2n\pi}{3}\right)}{(2n-1)^3} \quad in \ (0,1)$$

    f) Find the Fourier transform of $f(x) = \begin{cases} 1 & if \ 0 < x < 1 \\ 2 & if \ 1 < x < 2 \\ 0 & if \ x > 2 \end{cases}$ (2M)

    g) Write the one dimensional wave equation.   (2M)

PART -B

2. a) Find the root of the equation $x^3 - x - 4 = 0$ using Iteration method.   (7M)

    b) Find the root of the equation $xe^x = 3$ using False position method.   (7M)

3. a) Given that $Sin45^0 = 0.7077$, $Sin50^0 = 0.766$, $Sin55^0 = 0.8192$, $Sin \ 60^0 = 0.866$ find   (7M)
        $Sin57^0$ using Gauss backward difference formula.

    b) Using Lagrange's formula fit the polynomial from the following table.   (7M)

X	1	2	5	6	10
Y	7	11	14	13	18

4. a) Evaluate $\int_0^2 \frac{dx}{1+x}$ by (i) Trapezoidal rule (iii) Simpson's 3/8th Rule.   (7M)

    b) Find y(1,2), By RK method of fourth order given that $\frac{dy}{dx} = x + y^2, y(1) = 1$.   (7M)

5. a) Find the Fourier series for $f(x) = \begin{cases} x, & -\pi < x < 0 \\ -x, & 0 < x < \pi \end{cases}$ (7M)

   b) Find the half range sine series of $f(x) = \begin{cases} -3 & -5 < x < 0 \\ 3 & 0 < x < 5 \end{cases}$ (7M)

6. a) Find the Finite Fourier sine transform of $f(x)$ defined by (7M)

   $f(x) = \begin{cases} x & 0 < x < \dfrac{\pi}{2} \\ \pi - x & \dfrac{\pi}{2} < x < \pi \end{cases}$

   b) Do the Fourier sine and cosine transform exist for e^{-ax} (7M)

7. a) Solve the PDE $\dfrac{\partial u}{\partial x} - 2\dfrac{\partial u}{\partial y} = u$ (7M)

   b) Solve the one dimensional heat equation. (7M)