$\boxed{R16}$

I B. Tech I Semester Supplementary Examinations, March – 2022
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. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**
~~~~~~

PART –A

1. a) Find the interval of existence of equation $x^4 = x + 10$ (2M)

    b) Write a formula for the half range cosine series of f(x) in [0,2]   (2M)

    c) Write a formula for the Fourier cosine transform   (2M)

    d) Find $\Delta(sin2x)$ if h = 1   (2M)

    e) Find y(1.2) given that by Euler's method $\frac{dy}{dx} = 2x + y$, $y(1) = 1$ (2M)

    f) What are the advantages of RK method   (2M)

    g) Write D Alembert's solution of wave equation   (2M)

PART –B

2. a) Find the Real root of e^x sin x =1 using False position method   (7M)

    b) Find the Real root of x^3-x- 4=0   using Iteration   method   (7M)

3. a) Find the Lagrange' s polynomial for the following data   (7M)

x	0	1	2
y	1	2	3

    b) Find y(1.5) from the following data   (7M)

x	1	2	3	4
y	20	35	45	60

4   a) Evaluate $\int_0^{\frac{\pi}{2}} sinx dx$ using Simpson's 1/3rd rule   (7M)

    b) Using RK method of second order find y(0.1) ,y(0.2) given that $\frac{dy}{dx} = 2y + 3e^x, y(0) = 0$ (7M)

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

   b) Find the Half range sine series of $f(x) = \begin{cases} 1 - x & 0 < x < 1 \\ x - 2 & 1 < x < 2 \end{cases}$ (7M)

6. a) Solve the PDE $\dfrac{\partial^2 u}{\partial x^2} = \dfrac{\partial u}{\partial y} + 2u$ by the method of variable separable method (7M)

   b) Derive the four conditions to Solve the wave equation $\dfrac{\partial^2 y}{\partial x^2} = c^2 \dfrac{\partial^2 y}{\partial t^2}$ (7M)

7. a) Do the Fourier sine and cosine transform exist for e^x (7M)

   b) Find the Fourier integral representation of $f(x) = \begin{cases} 1 - x^2 & if\ |x| \le 1 \\ 0 & if\ |x| > 1 \end{cases}$ (7M)