

I B. Tech II Semester Supplementary Examinations, March - 2022**MATHEMATICS-II (MM)**

(Com. to CE, ME, CSE, PCE, IT, Chem. E, Aero E, Auto E, Min E, Pet E, Metal E & Textile Engg)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answering the question in **Part-A** is Compulsory3. Answer any **THREE** Questions from **Part-B****PART -A**

1. a) Find the $\sqrt{10}$ using Newton Raphson method (4M)
- b) Prove that $E^{1/2} = \mu + \frac{1}{2}\delta$ (3M)
- c) Find $y(0.1)$ given that $y' = xy + 1$, $y(1) = 1$ by Euler's method (3M)
- d) Find half range sine series of $f(x) = x+2$ in $[0,1]$ (4M)
- e) Find Finite Fourier sine transform $f(x) = \frac{x}{a}$ on $(0,1)$ (4M)
- f) Find $Z(a^n)$ (4M)

PART -B

2. a) Find the Real root of $xe^x = 1$ using Iteration method (8M)
- b) Find the Real root of $2x - \log_{10} x = 7$ using Bisection method (8M)
3. a) Find the Lagrange's polynomial for the following data (8M)

x	-1	0	2	3
y	-8	3	1	12
- b) Find $y(3)$ from the data $y(-1)=10$, $y(0)=5$, $y(1)=8$, $y(2)=10$ using Newton Backward interpolation formula. (8M)
4. a) Find $y(0.1), y(0.2)$ using Euler's formula. If $\frac{dy}{dx} = 2e^x + y$, $y(0)=1$ by taking $h = .05$ (8M)
- b) Given that $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 0$ Compute $y(0.1)$ & $y(0.2)$ using Picard's Method. (8M)
5. a) Obtain the Fourier series of $f(x) = x \cos\left(\frac{\pi x}{2}\right)$ in $-1 \leq x \leq 1$ (8M)
- b) Find the Half range sine series of $f(x) = x(1-x)$ in $[0, \pi]$ (8M)
6. a) If $F(p)$ is the complex Fourier transform of $f(x)$ then prove that Fourier transform of $f(ax)$ is $\frac{1}{a} F\left(\frac{p}{a}\right)$ (8M)
- b) Find the Fourier cosine transform of $\frac{1}{1+x^2}$ (8M)
7. a) Evaluate $Z^{-1} \left[\frac{z^2}{(z-1)(z-2)} \right]$ (8M)
- b) Solve the difference equation, $y_{n+2} - 4y_{n+1} + 3y_n = 0$ given that $y_0 = 2$ and $y_1 = 4$. using Z - transform (8M)