Code No: R13207 **R13** **SET-1**

I B. Tech II Semester Supplementary Examinations, December - 2020
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 Compulsory
3. Answer any **THREE** Questions from **Part-B**

~~~~~~

PART –A

1\. a) Find the Root of the equation 3x = 1+cosx using iteration method. (4M)

b) Prove that $\Delta \log f(x) = \log\left[1 + \frac{\Delta f(x)}{f(x)}\right]$ (3M)

c) Find y(0.1),y(0.2using Euler's formula. If $\frac{dy}{dx} = 2e^x + y$,y(0)=2 (4M)

d) Obtain Half range sine series for f(x) = cosx in [0, π] (4M)

e) Find the Fourier transform of $f(x) = x$ for $0 < x < \pi$ (4M)

f) Find the Z-transform of unit step function. (3M)

PART -B

2\. a) Find the real root of the $xe^x = 1$ using bisection method. (8M)

b) Find the real root of the $x\log x_{10} = 1.2$ using Newton Raphson method. (8M)

3\. a) Find y(25), Given that $y_{20}=24, y_{24}=32, y_{28}=35, y_{32}=40$ using Newton forward difference formula. (8M)

b) Find the interpolating polynomial f(x) from the table. (8M)

x	0	1	4	5
f(x)	4	3	24	39

4\. a) Solve $\frac{dy}{dx} = xy$ using Picard's method for x=0.2 given that y (0)=1 (8M)

b) By Taylor's method find y(0.4) given that $\frac{dy}{dx} = 3x + y^2, y(0) = 1$ (8M)

5\. a) Obtain the Fourier expansion of xsinx as cosine series in (0,π) (8M)

b) Find the Half range cosine series for $f(x) = \begin{cases} x & 0 < x < \frac{1}{2} \\ (1-x) & \frac{1}{2} < x < 1 \end{cases}$ (8M)
~~~~~~

6\. a) Using Fourier integral show that $e^{-ax} - e^{-bx} = \frac{2(b^2 - a^2)}{\pi} \int_0^\infty \frac{\lambda \sin \lambda x}{(\lambda^2 + a^2)} d\lambda, a, b > 0$ (8M)

b) Prove that $F\{x^n f(x)\} = (-i)^n \frac{d^n}{dp^n}[F(p)]$ (8M)

7\. a) Find the inverse Z – transform of $\left[\frac{z}{z^2 + 11z + 24}\right]$ (8M)

b) Evaluate $Z^{-1}\left[\frac{z^2}{(z-3)(z-2)}\right]$, using convolution theorem. (8M)