

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2019
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 $2x = \cos x$ using iteration method. (4M)
- b) Prove that $\mu\delta = \frac{1}{2}[\Delta + \nabla]$ (4M)
- c) Find $y(0.1), y(0.2)$ using Euler's formula if $\frac{dy}{dx} = e^x + y, y(0)=1$. (4M)
- d) Find a half range of Sine Series for $f(x) = ax + b$ in $0 < x < 1$. (4M)
- e) Write the Dirichlet conditions for Fourier transforms. (3M)
- f) Find $Z(a^n)$. (3M)

PART -B

2. a) Find the real root of the $xe^x = 3$ using bisection method. (8M)
- b) Find the real root of the $x \log_{10} x = 1.2$ using False position method. (8M)
3. a) Find the Missing terms in the following data. (8M)

x	45	50	55	60	65
y	3	--	2	--	-2.4

- b) Use Lagrange's formula to calculate $f(3)$ from the following table. (8M)

X	0	1	2	4	5	6
Y	1	14	15	5	6	19

4. a) Solve $\frac{dy}{dx} = x + y^2$ using Picard's method for $x=0.1$ given that $y(0)=1$. (8M)
- b) By Runge kutta method of fourth order find $y(0.1)$ given that (8M)

$$\frac{dy}{dx} = 3x + y^2, y(0) = 1$$

5. a) Find Fourier expansion for the function $f(x) = x - x^2$ $-1 < x < 1$. (8M)
- b) Find the Half range cosine series for $f(x) = \begin{cases} kx & 0 < x < \frac{\pi}{2} \\ k(\pi - x) & \frac{\pi}{2} < x < \pi \end{cases}$ (8M)
6. a) Find the Fourier transform of $f(x)$ defined by $f(x) = e^{-\frac{x^2}{2}}$, $-\infty < x < \infty$ (8M)
- b) Find the Fourier sine transform of $\frac{x}{a^2 + x^2}$ (8M)
7. a) State and prove final value theorem. (8M)
- b) Evaluate $Z^{-1} \left[\frac{z^2}{(z-1)(z-2)} \right]$, using convolution theorem. (8M)