

I B. Tech II Semester Supplementary Examinations, Nov/Dec - 2018
MATHEMATICS-II (MM)

(Com. to CE,EEE,ME,AE,AME,Bio-Tech,Chem E,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 question in **Part-A** is Compulsory
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) Write the two approximations of $x \log_{10} x = 1.2$ by Newton Raphson method. (2M)
- b) Define Average operator. (2M)
- c) Write the demerits of Picard's method. (2M)
- d) Write Formula for Simpson's 1/3rd rule. (2M)
- e) Write Dirichlet conditions on Fourier transform. (2M)
- f) Write the half range sine series in (0, L). (2M)
- g) Write the linear solution of wave (one dimensional) equations. (2M)

PART -B

2. a) Find the Real root of the equation $x^3 + 2x^2 + 10x - 20 = 0$ using Bisection method. (7M)
- b) Find the Real root of the equation $xe^x = \cos x$ using false position method. (7M)
3. a) Find $f(0.5)$ using the data (0,5), (1,1),(2,8), (3,15),(4,25),(5,30). (7M)
- b) Find the polynomial satisfied by (1, 2), (3,3), (4,5), (6,9). (7M)
4. a) Find $y(0.2)$, $y(0.4)$ given that $y' = \frac{1}{2}xy$, $y(0) = 1$ by modified Euler's method. (7M)
- b) Evaluate $\int_1^2 \frac{dx}{x}$ using (i) Simpson's 1/3rd rule with $h = 0.5$ (ii) Trapezoidal rule (7M)
with $h = 0.25$.

5. a) Find the half range cosine series $f(x) = \begin{cases} -x, & 0 < x < \frac{\pi}{2} \\ x, & \frac{\pi}{2} < x < \pi \end{cases}$ (7M)

- b) Find the Fourier series for $f(x) = \begin{cases} x, & 1 < x < 2 \\ 0, & 2 < x < 3 \end{cases}$ (7M)



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

b) Find the Fourier transform of $f(x) = \begin{cases} 1, & |x| < a \\ 0, & |x| > a \end{cases}$ (7M)

$$\text{Deduce that } \int_0^{\infty} \frac{\sin t}{t} dt = \frac{\pi}{2} \quad \text{and} \quad \int_0^{\infty} \frac{\sin^2 t}{t^2} dt = \frac{\pi}{2}$$

7. a) Solve the PDE $\frac{\partial u}{\partial x} - 2\frac{\partial u}{\partial y} = u$ and $u(x, 0) = 3e^{-5x} + 2e^{-3x}$ (7M)

b) A Rod of length 10 cm has its ends A and B kept at 50°C and 100°C until steady state conditions prevail. The temperature at A is then suddenly raised to 90°C and that at B is lowered to 60°C and the end temperatures are there after maintained. Find the temperature at a distance x from one end at a time. (7M)

