

**I B. Tech II Semester Supplementary Examinations, November - 2021**  
**MATHEMATICS-II (MM)**

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

Time: 3 hours

Max. Marks: 70

- Note: 1. Question paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answering **ALL** the questions in **Part-A** is Compulsory  
 3. Answer any **THREE** Questions from **Part-B**

**PART -A**

1. a) Find the relation between  $\Delta, \nabla, E$  (4M)
- b) Find the real root of  $x = \sin x$  using bisection method up to four iterations. (4M)
- c) Find  $y(0.1)$  if  $\frac{dy}{dx} = y + 1, y(0) = 1$  using Euler's method. (4M)
- d) Find the half range sine series of  $f(x) = x$  in  $[0, 1]$  (4M)
- e) State and prove change of scale property in Fourier transform. (3M)
- f) Find the Z- trans form unit step function. (3M)

**PART -B**

2. a) Find  $f(35)$  using Newton Back word interpolation formula from the following table. (8M)

X	10	20	30	40
Y	12	18	34	78

- b) Using Lagrange's formula calculate  $f(4)$  from the following table. (8M)

x	0	3	6
f(x)	1	4	5

3. a) Find the positive root of  $\sqrt{12}$  using Newton Raphson Method. (8M)
- b) Find the positive root of  $\cos x = x$  using False position Method. (8M)
4. a) Evaluate  $y(0.2)$  and  $y(0.4)$  by RK method of second order if  $y' = 1 + 2xy, y(0) = 1$  by taking  $h = 0.2$  (8M)
- b) By Taylor's series method find  $y(0.1)$  given that  $\frac{dy}{dx} = x^2 + y^2, y(0) = 1$  (8M)
5. a) Find the Fourier series of  $f(x) = \pi + x$  in  $(-\pi, \pi)$  (8M)

- b) Find the Half range cosine series of  $f(x) = \begin{cases} x & 0 < x < 1 \\ -x & 1 < x < 2 \end{cases}$  (8M)
6. a) Find the inverse Fourier transform  $f(x)$  of  $f(p) = e^{-|p|y}$  (8M)
- b) Find the Fourier cosine transform of  $f(x) = \begin{cases} x^2 & \text{if } |x| < a \\ 0 & \text{if } |x| > a \end{cases}$  (8M)
7. a) Solve the difference equation  $y_{n+2} - 7y_{n+1} - 8y_n = 2^n$ ,  $y_0 = y_1 = 0$  using Z-Transforms (8M)
- b) Find  $Z^{-1} \left[ \frac{z}{(z-1)(z^2+1)} \right]$  (8M)