

**I B. Tech I Semester Supplementary Examinations, January - 2020**  
**MATHEMATICS-II (MM)**

(Com. to ECE, EEE, EIE, Bio-Tech, E Com E, Agri E)

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) Show that  $\delta = E^{1/2} - E^{-1/2}$ . (4M)
- b) Find the real root of  $x = \sin x$  using Iteration method. (4M)
- c) Find  $y(0.1)$  If  $\frac{dy}{dx} = xy + 1, y(0) = 1$  using Euler's method. (4M)
- d) Find the half range sine series of  $f(x) = x^2$  in  $[0,1]$  (4M)
- e) State and prove modulation theorem in Fourier transform. (3M)
- f) Find the Z- trans form unit impulse function. (3M)

**PART -B**

2. a) Find  $f(25)$  using Gauss Back word interpolation formula from the following table. (8M)

x	10	20	30	40
y	12	18	34	78

(8M)

- b) Using Lagrange's formula calculate  $f(3)$  from the following table.

x	0	1	2	4	5	6
f(x)	1	14	15	5	6	19

3. a) Find the positive root of  $\sqrt{28}$  using iteration Method. (8M)
- b) Find the positive root of  $\cos x = x$  using Bisection Method. (8M)
4. a) Evaluate  $y(0.2)$  and  $y(0.4)$  by RK method of fourth order if  $y' = 1 - 2xy, y(0) = 0$ . (8M)
- b) By Picard's method find  $y(0.4)$  given that  $\frac{dy}{dx} = x^2 + y^2, y(0) = 0$  (8M)
5. a) Find the Fourier series of  $f(x) = \pi - x$  in  $(-\pi, \pi)$  (8M)

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

6. a) Express the  $f(x)$  defined by  $f(x) = \begin{cases} 1 & \text{if } |x| < 1 \\ 0 & \text{if } |x| > 1 \end{cases}$  as a Fourier integral (8M)

Hence Evaluate  $\int_0^{\infty} \frac{\sin \lambda \cos \lambda x}{\lambda} d\lambda$

- b) Find the Fourier 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 using z-transform method. (8M)

$$y_{n+2} = y_{n+1} - y_n \quad y_0 = 0, y_1 = 1$$

- b) Find (i)  $Z[e^{-an} \sin n\theta]$  (ii)  $Z^{-1}\left[\frac{2z}{(z-1)(z^2+1)}\right]$  (8M)