Code No: R13107 **R13** SET - 1

I B. Tech I Semester Supplementary Examinations, December- 2021
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**

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PART –A

1. a) Evaluate $(\Delta+\nabla)(x^2+x)$ by taking h=1. (4M)

   b) Find four iterations of 3x = 1+cosx iteration method. (4M)

   c) Using Taylor's series Find y(2.1), Given that $\frac{dy}{dx}=\frac{x-y}{x}$, $y(2)=2$ (3M)

   d) Find the half range sine series of f(x) = x+2 in [0,1] (4M)

   e) Find the Fourier transform of $f(x)$ defend by $f(x)=\begin{cases}\frac{x}{2} & if\ |x|<2\\ 0 & if\ |x|>2\end{cases}$ (4M)

   f) Find the z –transform of $(1/2)^n+(1/3)^n$ (3M)

PART -B

2. a) Find f(5) from the following table. (8M)

x	1	2	3	4
y	11	20	44	79

   b) Find polynomial which is passing through the following points (8M)
   (1, 21) ,(3,15),(4,18),(6,25)

3. a) Find the positive root of $x \log x_{10} = 1.2$ using Bisection Method. (8M)

   b) Find the positive root of $xe^x = 2$ using Newton Raphson Method . (8M)

4. a) Find y(0.1) and y(0.2) using Runge-Kutta 4th order, given that $y'=\frac{x^2+y}{x+y}$, y(0)=1 (8M)

   b) Find y(0.1) by Modified Euler's method given that $\frac{dy}{dx}=\frac{y-x}{y+x}, y(0)=1$ (8M)

5. a) Expand f(X)= xsinx $0<x<2\pi$ as a Fourier series and deduce that (8M)

   $\sum_{n=2}^{\infty}\frac{1}{n^2-1}=\frac{3}{4}$
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b) Find the Half range cosine series of $f(x)=\begin{cases}\frac{x}{2}, & 0\le x\le\frac{\pi}{2}\\ \frac{-x}{2}, & \frac{\pi}{2}<x<\pi\end{cases}$ (8M)

6. a) Find the Finite Fourier sine transform of $f(x)$ defined by (8M)

$$f(x)=\begin{cases}x & 0<x<\frac{\pi}{2}\\ \pi-x & \frac{\pi}{2}<x<\pi\end{cases}$$

b) Using Fourier integral, Show that $\int_0^\infty \frac{\sin\pi\lambda}{1-\lambda^2}\sin\lambda x\,d\lambda=\begin{cases}\frac{1}{2}\pi\sin x & if\ 0<x<\pi\\ 0 & if\ x>\pi\end{cases}$ (8M)

7. a) State and prove final value theorem in Z-transforms. (8M)

b) Solve the difference equation $y_{n+2}-4y_{n+1}+3y_n=0,\ y_0=2, y_1=4$ using Z-Transforms. (8M)