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

I B. Tech I Semester Supplementary Examinations, Jul/August - 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) Prove that $E = e^{hD}$ where D is the differential operator. (4M)

   b) Solve $3x = 1+\cos x$ using Iteration method. (4M)

   c) Evaluate y (0.1) by Euler's method for $\frac{dy}{dx} = x + y,\ y(0) = 1$. (3M)

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

   e) Find the finite Fourier sine transform of defend by $f(x) = 1\ in\ [0,1]$ (4M)

   f) Find the z –transform of the sequence { -3, 2, 5, 0, 12} (3M)

PART –B

2. a) Find f(25) using Gauss Forward inter polation formula from the following table (8M)

x	10	20	30	40
y	11	20	44	80

   b) Find polynomial which is passing through the following points (8M)
   (1, 2) ,(2,5),(4,12),(5,33)

3. a) Find the positive root of $2x - \log x_{10} = 7$ using Newton Raphson Method. (8M)

   b) Find the positive root of $xe^x = 3$ using False position Method. (8M)

4. a) Find y(0.1) using Runge-Kutta method of second order , given that $y' = x - y^2$, (8M)
   y(0)=1

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

5. a) Find the Fourier series of $f(x) = e^x$ in (0,2). (8M)

   b) Find the Half range cosine series of $f(x) = \cos ax$ in $[0,\pi]$. (8M)
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6. a) 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)

b) Find the Fourier transform of $e^{-\frac{x^2}{2}}$ $(-\infty < x < \infty)$ (8M)

7. a) Find (i) $Z^{-1}\left[\frac{z}{z^2+7z+10}\right]$ (ii) $Z\left[e^{-an}\sin n\theta\right]$ (8M)

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