I B. Tech I Semester Supplementary Examinations, Oct/Nov - 2018
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 $\mu^2 = 1 + \dfrac{\delta^2}{4}$ (4M)

    b) Find four iterations of $x^3 - 3x + 1 = 0$ using Iteration method.   (4M)

    c) Apply Euler method to find the solution of $\dfrac{dy}{dx} = 1 + y$ and $y(0) = 1$ at $x = 0.25$.   (4M)

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

    e) Find the Fourier transform of $f(x) = \begin{cases} ax, & for\ |x| < 1 \\ 0, & for\ |x| > 1 \end{cases}$ (3M)

    f) Find the Z- trans form of 2^{2k+3} (3M)

PART -B

2. a) Find f(45) from the following table.   (8M)

x	10	20	30	40
y	20	35	40	47

    b) Find y(x) and y^1(x) for the following table.   (8M)

x	0	1	2	3
y	1	2	1	10

3. a) Find the positive root of $2^x - 3x = 0$ using False position Method.   (8M)

    b) Find the positive root of $xe^x = 1$ using Bisection Method.   (8M)

4. a) Evaluate y (1.2) and y (1.4) by RK method of fourth order if $y' = 1 + 2xy, y(1) = 1$.   (8M)

    b) Find y(0.2),y(0.4) by Modified Euler's method given that $\dfrac{dy}{dx} = x + \left|\sqrt{y}\right|, y(0) = 1$ (8M)

5. a) Find the Fourier series of $f(x) = \begin{cases} 0, & -\pi < x < 0 \\ 1, & 0 < x < \pi \end{cases}$ (8M)

       Hence deduce that $1 - \dfrac{1}{3} + \dfrac{1}{5} + \ldots = \dfrac{\pi}{4}$

b) Find the Half range cosine series $f(x) = \begin{cases} \dfrac{1}{2} + x & 0 \le x \le \dfrac{1}{4} \\ \dfrac{1}{2} - x & \dfrac{1}{4} < x < \dfrac{1}{2} \end{cases}$ (8M)

6. a) Find the fourier sine transform of $f(x) = \dfrac{e^{-ax}}{x}$ (8M)

b) Using Fourier integral, Show that $\displaystyle\int_0^\infty \dfrac{1 - \cos \pi\lambda}{\lambda} \sin \lambda x \, d\lambda = \begin{cases} \dfrac{\pi}{2} & if \ 0 < x < \pi \\ 0 & if \ x > \pi \end{cases}$ (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) If $f(z) = \dfrac{2z^2 + 3z + 4}{(z-1)^3}$, $|z| > 3$, then find the value of f(1), f(2) and f(3) (8M)