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

I B. Tech I Semester Supplementary Examinations, Nov/Dec - 2017
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. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Evaluate $1/\sqrt{12}$ using Newton Raphson method. (4M)

   b) Prove that $1+\mu^2\delta^2 = \left(1+\frac{1}{2}\delta^2\right)^2$ (3M)

   c) By Euler's method find y(0.2), y(0.4) given that $\frac{dy}{dx} = 2x^2 + \sin y, y(0) = 1$ (4M)

   d) Find a_0, a_n for $f(x) = \frac{x}{c}$ in $[0, 2\pi]$. (4M)

   e) State and prove change of scale property in Fourier transform. (4M)

   f) Find $Z(n)$. (3M)

PART -B

2. a) Find the four approximations of $xe^x = 1$ by False position method. (8M)

   b) Find the four approximations of $x\log_{10} x = 2$ by Bisection method. (8M)

3. a) Given that $\sin 45^0 = 0.7077$, $\sin 50^0 = 0.766$, $\sin 55^0 = 0.8192$, $\sin 60^0 = 0.866$ find $\sin 52^0$ using Newton's forward difference formula. (8M)

   b) Find the unique polynomial p(x) of degree 2 or less such that p(1)=1, p(3)=27, p(4)=64 using Lagrange's interpolation formula. (8M)

4. a) Evaluate y (0.1), y (0.2) &y (0.3) using Picard's method given that $Y^1 = y^2 - x^2$, y (0) =1. (8M)

   b) By RK method find y(0.2),y(0.4) given that $\frac{dy}{dx} = 2x + y^2, y(0) = 1$ (8M)

5. a) Find the half-range cosine series for the function f(x) = x in the range $0<x<\pi$. (8M)

   Hence deduce that $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \ldots\ldots = \frac{\pi^2}{8}$

   b) Find the Fourier series of $f(x) = x - x^2$ in $0 < x < 3$. (8M)

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6. a) Using Fourier integral show that $e^{-ax} - e^{-bx} = \frac{2(b^2 - a^2)}{\pi}\int_0^\infty \frac{\lambda \sin \lambda x}{(\lambda^2 + a^2)} d\lambda, a, b > 0$ (8M)

   b) Find finite Fourier cosine transform of f(x) = x - a for $0 < x < \pi$. (8M)

7. a) Prove that if $Z(f(n)) = F(z)$, then $Z[f(n-k)] = z^{-k} F(z)$. (8M)

   b) Solve the difference equation $y_{n+2} - 7y_{n+1} - 8y_n = 2^n$, $y_0 = y_1 = 0$ using Z-Transforms. (8M)