

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**
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 $\sin 45^\circ = 0.7077$, $\sin 50^\circ = 0.766$, $\sin 55^\circ = 0.8192$, $\sin 60^\circ = 0.866$ find $\sin 52^\circ$ 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 $Y' = y^2 - x^2$, $y(0) = 1$. (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 $\frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots = \frac{\pi^2}{8}$
- 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)