PVP 14

Code: EC3T1

II B.Tech - I Semester – Regular/Supplementary Examinations
November - 2019

ENGINEERING MATHEMATICS - III
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks
11x 2 = 22 M

1.

a) To solve the equation $x^3+x^2-1=0$ by Iteration method, the iterative function Ø(x) is ?

b) Prove that $E = 1 + \Delta$.

c) Write the Fourth order Runge-Kutta method Formulae to solve the First Order Differential equation.

d) Apply Picard's method to find y_1 of $y' = xy + 1$ with $y(0) = 1$

e) Verify the Analyticity of $f(z) = z^2$.

f) Find *b* such that $u = e^{bx} \cos 3y$ is harmonic.

g) Find the value of $\int_0^{1+i} z^2 dz$ along the line x = y.

h) State the Taylor's series of f(z) about the point z = a.

i) Find the singularities of $\frac{z^2 + 1}{1 - z^2}$.

j) Find the residue of $\frac{1}{(z+1)(z+3)}$ at z = -1.

k) Find the Invariant points of the Transformation $w = \frac{6z-9}{z}$.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Find a real root of $x \log_{10} x - 1.2 = 0$ using Newton-Raphson's method. 8 M

b) Find y (32) using Gauss Forward Differences formula for the following data 8 M

x	25	30	35	40
y	0.2707	0.3027	0.3386	0.3794

3. a) Solve for y at x = 0.1, 0.2 given that $y' = x^2 - y, y(0) = 1$ by R-K method of 4^{th}-order. 8 M

b) Apply Milne's Predictor Corrector Method to find y (0.4) from the equation $\frac{dy}{dx} = xy + y^2$, y(0) = 1 by obtaining the starting value by Euler's method. 8 M

4. a) Prove that z^n (n is a positive integer) is Analytic and hence find its derivative. 8 M

b) Find the Analytic function whose Imaginary part is $e^{-x}(x\cos y + y\sin y)$. 8 M

5. a) Evaluate $\int_C \frac{e^z}{(z-1)(z-4)}dz$ where C: |Z| = 2. 8 M

b) Obtain the Laurent series expansion of $f(z) = \frac{z+3}{z(z^2 - z - 2)}$ in powers of z where 8 M

(i) |z| < 1 (ii) 1 < |z| < 2 (iii) |z| > 2

6. a) Using the method of Contour Integration Evaluate

$$\int_0^{2\pi} \frac{\sin 3\theta}{5 - 3\cos\theta} d\theta$$

8 M

b) Find the Bilinear transformation that maps the points (0,1, ∞) in z-plane onto the points (-1, -2, -i) in the w-plane. 8 M