PVP 14

Code: EC3T1

II B.Tech - I Semester – Regular Examinations – December 2015

ENGINEERING MATHEMATICS - III
(ELECTRONICS AND 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) Write Newton-Raphson formula to find the root given equation.

b) Write $\nabla^3 y_3$ in terms of entries.

c) Find $y(0.1)$ by Euler's method, if $y' = x + y,\ y(0) = 1.$

d) Write Milne's predictor formula.

e) Find the singular points of $f(z) = \bar{z}$.

f) Find the derivative of $f(z)$ whose real part is $e^x \cos y + x$.

g) Evaluate $\oint_C (z-a)^{-1}\, dz$, where $C: |z-a| = 1$ traversing in anticlock-wise sense.

h) What type of singular points the function $f(z) = \dfrac{\sin z}{z}$ has.

i) Find the residue of $f(z) = z^{10} e^{-\frac{1}{z}}$ at $z = 0.$

j) Find the image of $x-\text{axis}$ under the transformation $w=\frac{1}{z}$. 1

k) Find the critical points of the transformation $w=z+\frac{1}{z}$. 1

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Find an approximate real root of the equation $x^3-2x^2+x-2=0$ by Bisection method. 8 M

b) From the following table, find y when x=38. 8 M

x	30	35	40	45	50
y	15.9	14.9	14.1	13.3	12.5

3. a) Solve $y'=x^2-y, y(0)=1$ using Taylor's series method and compute $y(0.1)$, $y(0.2)$, $y(0.3)$ and $y(0.4)$. 8 M

b) Using Runge-Kutta method of fourth order, find an approximate value of $y(1.2)$, in steps of 0.1 from the differential equation $y'=x^2+y^2$, $y(1)=1.5$. 8 M

4. a) Show that the function $f(z)=\sqrt{|xy|}$ is not analytic at the origin, although C-R equations are satisfied at the origin. 8 M

b) Find an analytic function whose imaginary part is

$2xy + \cos x \sinh y$. 8 M

5. a) Evaluate $\int_C \frac{e^{iz}}{\left(z^2-\pi^2\right)^2} dz$, where $C:|z|=2\pi$. 8 M

b) Find all the possible Laurent's series expansion of

$f(z)=\frac{z}{\left(z^2-4\right)(z-3)}$ about z=0 i.e., i) |Z|<3

ii) 3<|Z|<4 iii) |Z|>4 8 M

6. a) Evaluate $\int_{-\infty}^{\infty} \frac{x^4}{\left(x^2+9\right)\left(x^2+4\right)^2} dx$, using Cauchy's residue theorem. 10 M

b) Find the image of the rectangular region bonded by the lines $x=-2,\ x=2,\ \ y=-1$ and $y=1$ under the transformation $w=e^z$. 6 M