PVP 12

Code: EC3T1

II B.Tech - I Semester – Regular Examinations - January 2014

ENGINEERING MATHEMATICS - III
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) Find a real root of the equation $x^3 - x - 1 = 0$ by using bisection method? 7 M

b) Write the iterative formula to find $\sqrt[k]{N}$ and hence evaluate $(30)^{-1/5}$. 7 M

2 a) Use Gauss's forward formula to evaluate y_{30}, given that $y_{21} = 18.4708, y_{25} = 17.8144,\ y_{29} = 17.1070,$ $y_{33} = 16.3432$ and $y_{37} = 15.5154.$ 7 M

b) Use Lagrange's interpolation formula to find the value of y when x=10, for the following table 7 M

x	5	6	9	11
y	12	13	14	16

3 a) Given that

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.989	8.403	8.781	9.129	9.451	9.750	10.031

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at x=1.6. 7 M

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Simpson's 1/3 rule taking h=1/4. 7 M

4 a) Employ Taylor's method to obtain approximate value of y at x =0.2 for the differential equation $\frac{dy}{dx} = 2y + 3e^x$, $y(0) = 0$. 7 M

b) Find $y(0.2)$ using Runge-Kutta 4th order formula from $\frac{dy}{dx} = x^2 - y$ and $y(0) = 1$. 7 M

5 a) Find the analytic function $z = u + iv$, if $u - v = \frac{(x-y)}{(x^2+4xy+y^2)}$. 7 M

b) S.T. the function $f(z) = \sqrt{|xy|}$ is not analytic at the origin even though Cauchy-Riemann equations are satisfied thereof. 7 M

6 a) Evaluate $\int_{1-i}^{2+3i} (z^2 + z)\, dz$ along the line joining points (1,-1) and (2,3) 6 M

b) Evaluate $\int_c \frac{sin^2 z}{\left(z-\frac{\pi}{6}\right)^3} dz$, where c is the circle $|z| = 1$. 4 M

c) Expand $f(z) = \frac{1}{(z-1)(z-2)}$ in the region $1 < |z| < 2$. 4 M

7 a) Find the nature and location of singularity of the function $f(z) = (z+1)\sin(\frac{1}{z-2})$. 7 M

b) Apply calculus of residues to prove that $\int_0^{2\pi} \frac{d\theta}{1-2psin\theta+p^2} = \frac{2\pi}{1-p^2} (0 < p < 1)$. 7 M

8 a) Find the r transformation which maps the points -1,i,1 of the z-plane into 1,i,-1 of the w-plane. 7 M

b) Find the image of an infinite strip bounded by x = 0 and x = $\frac{\pi}{4}$ under the transformation $w = cosz$. 7 M