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EAS-501

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 151501

Roll No.

B. Tech.

(SEM. V) (ODD SEM.) THEORY EXAMINATION, 2014-15

COMPUTER BASED NUMERICAL METHODS

Time : Hours] [Total Marks : **100**

1 Attempt any FOUR parts **5×4=20**

a) Find the positive root of $x^3 - x = 1$ correct to 3 decimal places by bisection method.

b) Solve $x^3 - 4x + 1 = 0$ by Regula Falsi method.

c) By iteration method solve for a positive root $x^3 = 2x + 5$

d) Using Newton-Raphson method find a root of f(x) = 3x-cosx-1 = 0 correct to 6 decimal places.

e) Calculate upto 5 iteration to estimate the root of the equation $x^2 - 4x - 10 = 0$ with the initial estimate of x_1=4 and x_2=2 by secant method.

f) Compute two iteration to find the roots of equations $x^2 + xy = 6, x^2 - y^2 = 3$ using N–R method.

2 Attempt any TWO parts **10×2=20**

a) Solve the system of equations by

(i) Gauss elimination and

(ii) Gauss-Jordan method

$$x+2y+z=3;2x+3y+3z=10;3x-y+2z=13.$$

b) Use LU decomposition to solve

$$x+y+z=3;2x-y+3z=16;3x+y-z=-3.$$

c) Apply Gauss-Jacobi method to solve

$$10x-5y-2z=3;x+6y+10z=-3;4x-10y+3z=-3.$$

3 Attempt any TWO parts : **10×2=20**

a) Find the cubic polynomial from the following table using Newton's divided difference formula :

X	0	1	2	5
Y	2	3	12	147

b) Estimate f(7.5)

X	1	2	3	4	5	6	7	8
$f(X)$	1	8	27	64	125	216	343	512

c) Using three point Gaussian quadrature formula evaluate

$$\int_2^4 (1+x^4)dx.$$

4 Attempt any TWO parts **10×2=20**

a) Using Taylor method compute y(0.2) and y(0.4) correct to 4 decimal places given $\frac{dy}{dx}=1-2xy$,y(0)=0

b) By R.K method of 4th order solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with y(0)=1 at x = 0.2

c) Given $y' = 1 - y$ and y(0)=0 find y(0.1) and y(0.2) ,y(0.3) by Euler method and y(0.4) by Milne's method

5 Attempt any TWO parts : **10×2=20**

a) Solve by finite difference method the B.V.P $y''(x) - y(x) = 2$ where y(0)=0 and y(1)=1 taking h=1/4.

b) Find the solution of $\nabla^2 u = 8x^2 y^2$ for square mesh given u=0 on the boundaries dividing the square into 16 sub-squares of length *l* unit.

c) Using power method find all the eigen values of

$$A = \begin{pmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{pmatrix}.$$