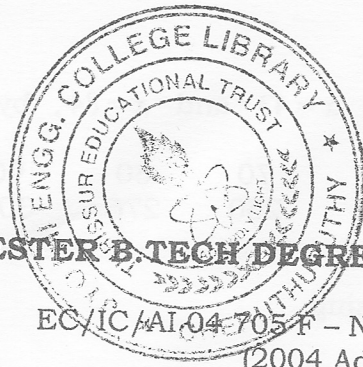


23144



Name : .....

Reg. No. : .....

**EIGHTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2011**

**EC/IC/AI-04-705-F - NUMERICAL ANALYSIS**  
(2004 Admission)

Time : Three Hours

Maximum : 100 Marks

*Answer all questions*

- I
1. Solve by the method of iteration :  $e^x - 3x = 0$
  2. Derive the iterative formula of Newton - Raphson method.
  3. Solve by Gauss-Jacobi's method (3 iteration only)  
 $10x - 5y - 2z = 3$ ;  $4x - 10y + 3z = -3$   
 $x + 6y + 10z = -3$
  4. Explain the differences among Gauss elimination method, Gauss-Jacobi method and Gauss-Seidal method.
  5. Evaluate  $\int_0^6 \frac{dx}{1+x}$  by Simpson's one third rule.
  6. Fit a paralola of the form  $y = ax^2 + lx + c$  passing through (0,0), (1,1) and (2,20) using lagrange's interpolation formula.
  7. Solve  $\frac{dy}{dx} = 1 - y$  given  $y(0) = 0$  using modified Euler method at  $x = 0.1$
  8. Using Taylor serils method find  $y(0.1)$  given  $\frac{dy}{dx} = x^2 - y$  and  $y(0) = 1$  correct to 4 decimal places.

(8×5=40)

- II (a) Perform one iteration of the Bairstow method to extract a quadratic factor from the polynomial equation  $x^4 + x^3 + 2x^2 + x + 1 = 0$

(Or)

- (b) Solve  $x^3 - 9x^2 + 18x - 6 = 0$  by Graffe's method (3 squarings)

- III (a) Using power method, find all the eigen values of

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

(Or)

- (b) Solve by Crout's method :  
 $x + y + z = 3$ ;  $2x - y + 3z = 16$ ;  $3x + y - z = 3$

- IV (a) Using Newton's divided differences formula find  $f(2)$  and  $f(8)$  given the data below.

x :	4	5	7	10	11	13
y :	48	100	294	900	1210	2028

(Or)

(b) From the following data find  $\theta$  at  $x=43$  and  $x=84$ , by using proper interpolation formula.

$x$	:	40	50	60	70	80	90
$\theta$	:	184	204	226	250	276	304

V (a) Solve  $\frac{dy}{dx} = \frac{3x+y}{x+2y}$ ,  $y(1)=1$  at  $x=1.1$  using

(i) using Runge-Kutta method of 4<sup>th</sup> order

(ii) Solve  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0$ ,  $0 \leq x, y, \leq 1$

With  $u(0, y) = 10 = u(1, y)$  and

$u(x, 0) = 0 = u(x, 1)$

(Or)

(b) (i) Compute  $y(0.25)$  by modified Euler method

Given  $\frac{dy}{dx} = 2xy$ ,  $y(0)=1$

(ii) Solve  $\frac{\partial^2 u}{\partial x^2} = 16 \frac{\partial u}{\partial t}$ ,  $0 < x < 1$ ,  $t > 0$

Given  $u(x, 0) = 0$ ,  $u(0, t) = 0$ ,  $u(1, t) = 100t$

Compute  $u$  for one step in  $t$  direction

Taking  $h = \frac{1}{4}$

(4×15 = 60)

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