D 12499 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2006

Computer Science

CS 104. NUMERICAL METHODS

(2004 and earlier admissions)

Time : Three Hours Maximum : 60 Marks

Part A

Answer any **five** *questions.*
Each question carries 3 *marks.*

1. Define Relative error and Percentage error.
2. Find the root of the equation $xe^x - 3 = 0$, that lies between 1 and 2, correct to four places of decimals, using the method of false position.
3. Find the smallest positive root of the equation $3x^3 - 9x^2 + 8 = 0$, correct to four places of decimals using Newton-Raphson method.
4. Find the inverse of the given matrix by Gauss elimination method :

$$\begin{matrix} 4 & 1 & 2 \\ 2 & 3 & -1 \\ 1 & -2 & 2 \end{matrix}$$

5. Determine the Lagranges method the percentage number of patients over 40 years, using the following data :—

Age over *(x)* years	30	35	45	55
% number (y) of patients :	148	96	68	34

6. Evaluate $\int_0^2 \log_e \sqrt{1+} \; dx$, using Simpson's one-third rule with 8 subintervals.
7. Using Taylor's series method of the fourth order, find y at x = 1.1 by solving the equation $\frac{dy}{dx} = x^2 + y^2$ given y (1) = 2.

(5 x -3 = 15 marks)

Turn over

Part B

Answer any **three** *questions.*
Each question carries **15** *marks.*

8. Solve the equation $\frac{dy}{dx} = \frac{1}{x+y}$, $y(0) = 1$ for y **(0·1),** using **Runge-Kutta** method of the fourth order.

9. Find all the **eigenvalues** and **eigenvectors** of the matrix **:**

$$\begin{vmatrix} 2 & 3 & 1 \\ 3 & 2 & 2 \\ 1 & 2 & 1 \end{vmatrix}$$

10. Find the quadratic factor $x^2 + px + q$ of the polynomial $x^4 - 3x^3 + 20x^2 + 44x + 54$ using **Bai** method and taking the initial values of p and q as 2 and 2.

11. Obtain the relation of the form $y = ab^x$ for the following data by the method of least **squa**

x :	2	3	4	5	6
y :	**8·3**	15.4	33.1	65.2	127.4

(3 x 15 = 4k.