

Paper 1 : NUMERICAL ANALYSIS - 2014

Note : Attempt any two parts from each question. All questions carry equal marks. Simple/scientific calculator is allowed.

UNIT - 1

- (a) Find the root of the equation : $x^3 - x - 4 = 0$ using the bisection method.
(b) Find the root of $x^2 - 5x + 2 = 0$ correct of five decimal places by Newton-Raphson method.
(c) Solve the equation : $6x^4 - 13x^3 - 35x^2 - x + 3 = 0$ one root being $2 - \sqrt{3}$.

UNIT - 2

- (a) Solve the equations :

$$x + 4y - z = -5$$

$$x + y - 6z = -12$$

$$3x - y - z = 4$$

Using Gauss-Jordan method.

- (b) Solve the system of linear equations :

$$x + 2y + 3z = 5$$

$$2x + 8y + 22z = 6$$

$$3x + 22y + 82z = -10$$

Using the Cholesky method.

- (c) Find the inverse of the matrix :

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$$

by Gauss-Jordan method.

UNIT - 3

- (a) Interpolate $f(2)$ from the following data:

x	1	2	3	4	5
$f(x)$	7	?	13	21	37

and explain why the value obtained is different from that obtained by putting $x = 2$ in the expression $2^x + 5$.

- (b) Compute $f(2, 4, 9, 10)$ when : $f(x) = x^4 + x^2 + 1$
(c) Find the value of x correct to two decimal places lying between 15 and 20 satisfying the equation :

$$x^2 + 250 \log_{10} x = 635$$

UNIT - 4

4. Given :

x	0.1	0.2	0.3	0.4
y = f (x)	1.10517	1.22140	1.34986	1.49182

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 0.4$

(b) Show that :

$$\int_0^1 \frac{dx}{1+x} = 0.69315$$

(c) Using Simpson's '1/3' rule evaluate :

$$\int_{0.5}^{0.7} x^{1/2} e^{-x} dx$$

UNIT - 5

5. (a) Use Picard's method to approximate y when $x = 0.1$, $x = 0.2$, given that :

$$y = 0, x = 0, \frac{dy}{dx} = x + y$$

(b) Solve $\frac{dy}{dx} = 1 - 2xy$ given that $y(0) = 0$ by Taylor's series.

(c) Use Runge-Kutta method of fourth order to solve :
 $y' = xy$ for $x = 1.2$. Initially $x = 1, y = 2$ (take $h = 0.1$).

http://www.prsunotes.com

Whatsapp @ 9300930012

Your old paper & get 10/-

पुराने पेपर्स भेजे और 10 रुपये पायें,

Paytm or Google Pay से