



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.Sc. Mathematics
ASSIGNMENT-SECOND YEAR

Last Date of Submission: 15 May 2015जमा करने की अन्तिम तिथि: 15 May 2015

Course Title: Numerical Analysis**Course Code: MAT 508****Year: 2014-15****Maximum Marks : 40****Section 'A'****भाग क**

Section 'A' contains 08 short answer type questions of 5 marks each. Learners are required to answers 4 questions only. Answers of short answer-type questions must be restricted to 250 words approximately.

1. Find the approximate value of root of the equation.

$$x - 1 = \sin x$$

2. Find $\sqrt{30}$ by using iterative process.

3. Fit a straight line to the given data regarding x as the independent variable:

x	:	1	2	3	4	5	6
y	:	1200	900	600	200	110	50

4. Find eigenvalue in magnitude and corresponding eigenvectors of the matrix

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

5. Express $1 - x^2 + 2x^4$ as a sum of Chebyshev polynomials.

6. Use Picard's method to approximate y when $x = 0.2$, given that $y=1$ when $x = 0$ and $\frac{dy}{dx} = x - y$.

7. Give Euler method for stability analysis.

8. Solve boundary value problem

$$\frac{d^2y}{dx^2} = y$$

$$y(0) = 0, \quad y(0.6) = 0.7.$$

Section 'B'

- **Section 'B' contains 04 long answer-type questions of 10 marks each. Learners are required to answers 02 questions only.**

1. Solve the equations

$$\begin{aligned}x - 3y + 10z &= 3 \\-x + 4y + 2z &= 20 \\5x + 2y + z &= -12\end{aligned}$$

by method of decomposition.

2 Find the dominant eigenvalue and corresponding eigen vector of the matrix

$$A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}, \text{ taking } x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$

3 Solve $x^3 - 8x^2 + 17x - 10 = 0$ by Graeffe's method, squaring three times.

4 Solve the boundary value problem

$$x^2y - 2y + x = 0$$

$y(2) = y(3) = 0$ with step size $h = 0.25$