

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEL, BEX, BCT, B.Agri.	Pass Marks	32
Year / Part	II / II	Time	3 hrs.

Subject: - Numerical Method (SH553)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

[5:18]



1. Define error. Explain different types of errors in numerical computation. [6]
2. Find a real root of the following equation correct to four decimals using False Position method. [6]

$$e^{\cos x} - \sin x - 1 = 0$$

3. Discuss the limitations of Newton-Raphson method while finding a real root of a non-linear equation. [4]
4. Solve the following system of equations using LU factorization method. [8]

$$\begin{aligned} 5x_1 + 2x_2 + 3x_3 &= 31 \\ 3x_1 + 3x_2 + 2x_3 &= 25 \\ x_1 + 2x_2 + 4x_3 &= 25 \end{aligned}$$

5. Write an algorithm for solving a system of linear equations of 'N' unknowns using Gauss-Jordan Method. [8]
6. Find y at x = 8 from the following data using Natural Cubic Spline interpolation. [8]

x	3	5	7	9
y	3	2	3	1

7. Fit the following set of data to a curve of the form $y = a b^x$. Also evaluate y(7). [8]

x	2	4	6	8	10	12
y	16.0	11.1	8.7	6.4	4.7	2.6

8. Evaluate the following integral using Romberg method. [6]

$$\int_0^2 \frac{e^x + \sin x}{1 + x^2} dx$$

9. Determine $y'(1)$ and $y''(1)$ from the following data. [4]

x	0.5	1.0	1.5	2.0	2.5
y	6	3	2	1.2	0.8

10. Solve the following initial value problem for y(1.2) using the Runge-Kutta fourth order method. [6]

$$y'' - 3y' + y = \sin x; \quad y(1) = 1.2; \quad y'(1) = 0.5$$

11. Write an algorithm to solve two point boundary value problem using shooting method. [6]

12. Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary conditions as shown in figure below.

[10]


