24 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division

2069 Bhadra

Exam.	Regular (2066 & Later Batch)		
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.*

1. Generate forward difference table from the following data. [4]

x	1	2	3	4	5	6
f(x)	2	9	28	65	126	217

2. Explain the mechanism of finding a real root of a non-liner equation using secant method. [4]
3. Find a root of $e^x = 3x$ using bisection method and Newtons Raphson method correct upto 3 decimal places. [4+4]
4. Solve following system of linear equation using Gauss elimination method. [8]

$$x + 2y + 3z = 6$$
$$2x + 3y + 5z = 10$$
$$2x - y + 3z = 4$$

5. Write Pseudo- code to solve a system of linear equations of 'N' unknowns using Gauss-Jordan method. [8]
6. Use Lagrange method to find f(2.5) from the following data : [8]

x	1	2	4	5	7
f(x)	1	1.414	1.732	2.00	2.6

7. Fit the following set of data to a curve of the form $y = a\,e^{bx}$ from the following observation by least square method. [8]

x	1	2	3	4	5	6
y	5.5	6.5	9.4	15.2	30.6	49.8

8. Derive the expression of Simpson's 1/3 rule for integration. [4]
9. Evaluate: $\int_2^4 e^{-x^2} dx$ using 2-point Gauss Legendre method. [6]

OR

Evaluate $\int_1^2 e^{-x^2} dx$ using Romberg method correct up to 3 decimal places.

10. Solve: $y'' + xy' + y = 0$; $y(0) = 1$; $y'(0) = 0$ for $x = 0(0.1)0.2$ using the RK2 method. [10]
11. Solve the elliptic equation $u_{xx} + y_{xx} = 0$ for the following square mesh with boundary conditions as shown in figure below. [12]