

Examination Control Division

2072 Ashwin

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

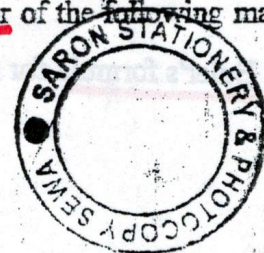
Subject: - Numerical Method (SH553)

- ✓ 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.

[T: 20] + 4

1. Discuss the difference between Absolute error and Relative error with examples. [4]
2. Derive Newton Raphson iterative formula for solving nonlinear equation, using Taylor series. [4]
3. Using the Bisection method, find a real root of the equation $f(x) = 3x - \sqrt{1 + \sin x}$ correct up to three decimal points. [8]
4. Develop pseudocode to solve a system of linear equations using Gauss Jordan method. [8]
5. Find the largest Eigen value and the corresponding Eigen vector of the following matrix using the power method with an accuracy of 2 decimal points. [8]

$$\begin{pmatrix} 1 & 2 & 1 \\ 2 & 1 & 2 \\ 1 & 2 & -1 \end{pmatrix}$$



6. Using appropriate Newton's Interpolation Techniques, estimate y(15) and y(85) from the following data: [8]

x	10	30	50	70	90
y	34	56	45	23	36

7. Fit the following data in to $y = a + b\sqrt{x}$ [8]

X	500	1000	2000	4000	6000
Y	0.20	0.33	0.38	0.45	0.51

8. Write an algorithm to calculate the definite integral $\int_a^b f(x)dx$ using composite simpson's 1/3 rule. [4]

9. The distance travelled by a vehicle at intervals of 2 minutes are given as follows: [6]

Time (min): 2 4 6 8 10 12

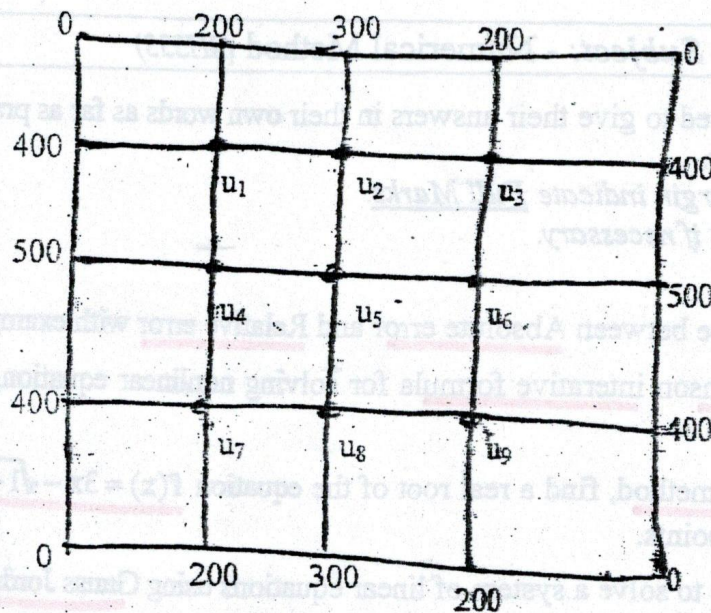
Distance (km): 0.25 1 2.2 4 6.5 8.5

Evaluate the velocity and acceleration of the vehicle at t = 3 minutes. [8]

10. Solve the following by RK-2 method for x = 0 (0.1) 0.2

$$\frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = 0; y(0) = 1, y'(0) = 0$$

11. Solve the Laplace equation $u_{xx} + u_{yy} = 0$ for the square mesh with boundary values as shown in the figure. [10]



12. Derive Euler's formula for solving initial value problem. [4]
