

Total No. of Printed Pages:02

SUBJECT CODE NO: - 2065
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y (Sem-IV)
Mathematics MAT - 401
Numerical Methods

[Time: 1 : 53 Hours]

[Max. Marks:50]

Please check whether you have got the right question paper.

- N.B
1. Attempt all questions.
 2. Figures to the right indicate marks.
 3. Use of non- programmable calculator and logarithmic table is allowed.

- Q.1
- A) Attempt any one. 08
- a) Explain the method of false position for finding real roots of an equation $f(x) = 0$.
 - b) Derive Larange’s interpolation formula.

- B) Attempt any one 07
- c) Obtain a root, correct to four decimal places, which lies between 2 and 3 of the equation $x^3 - 4x - 9 = 0$, using bisection method.

- d) The populations for town in decennial census were as under. Estimate the population for the year 1955.

| | | | | | |
|---------------------------|------|------|------|------|------|
| Year | 1921 | 1931 | 1941 | 1951 | 1961 |
| Population (in thousands) | 46 | 66 | 81 | 93 | 101 |

- Q.2
- A) Attempt any one. 08
- a) Prove that

$$\int_{-1}^1 \frac{T_m(x) T_n(x)}{\sqrt{1-x^2}} dx = \begin{cases} 0, & m \neq n \\ \frac{\pi}{2}, & m = n \neq 0 \\ \pi, & m = n = 0 \end{cases}$$

Where, $T_n(x)$ is chebyshev polynomial of degree n.

- b) Explain the Gauss – Jordan method for solving system of linear equations.

- B) Attempt any one.
- c) Fit a polynomial of the second degree to the data points given in the following table. 07

| | | | |
|---|-----|-----|------|
| x | 0 | 1.0 | 2.0 |
| y | 1.0 | 6.0 | 17.0 |

- d) Prove that, the degree in satisfies the differential equation $(1 - x^2) \frac{d^2y}{dx^2} - x \frac{dy}{dx} + n^2y = 0$

