

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURAJADA VIZINAGARAM

II B. Tech I Semester Regular/Supply Examinations, November – 2025

Numerical and Statistical Methods

(Civil and Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part A, Part B.**Part A is compulsory, Answer all questions.**In Part B, Answer any one question from each unit.*

PART-A

(20 Marks)

- 1 a) Classify the Algebraic equation from the following [2]
(i) $x = \cos x$ (ii) $x^2 - 4x + 5 = 0$
- b) Find $\Delta(e^x)$ if $h = 1$ [2]
- c) Write the trapezoidal rule [2]
- d) Write the two exponential curves [2]
- e) Find $y(0.1)$ using Euler's method given that $\frac{dy}{dx} = 1 + y$, $y(0) = 1$ [2]
- f) What are the advantages of modified Euler's method [2]
- g) Find the maximum error estimate for $\alpha = 5\%$, $n = 100$, $\sigma = 5$ [2]
- h) What is null hypothesis [2]
- i) Write two properties of F-test [2]
- j) What is mean by goodness of fit [2]

PART-B

(50 Marks)

Unit-1

- 2 Find the real root of $x^3 - x^2 + 1 = 0$ using bisection method [10]
(OR)
- 3 Find the interpolating polynomial $y(x)$ for the following data using Lagrange's method hence find $y(5)$. [10]

x	1	3	4	6	8
Y(x)	1	4	7	9	10

Unit-2

- 4 Fit the curve $y = a + bx + cx^2$ for the following data [10]

x	1	2	3	4	5
y(x)	10	12	8	10	14

(OR)

- 5 Find $\frac{dy}{dx}$, $\frac{d^2y}{dx^2}$ at $x = 23$ from the following data [10]

x	5	10	15	20	25	30
Y(x)	200	245	315	420	456	506

Unit-3

- 6 Find $y(0.1), y(0.2)$ using RK method of second order in terms of $h = 0.1$ given that $\frac{dy}{dx} = 1 + xy$, $y(0) = 1$ [10]
(OR)
- 7 Find $y(0.1), y(0.2)$ using Picard's method given that that [10]

$$\frac{dy}{dx} = x - y^2, y(0) = 1$$

Unit-4

- 8 In a district A 450 persons were consumers of tea out of 1000 persons , In a district B 400 persons were consumers of tea out of 800 . Do these facts reveal that is there a significant difference between the two districts as far as tea drinking habit at 1% level [10]

(OR)

- 9 In 64 random sample the mean and S.D are 1.038, 0.146 test the claim at 5% level to the null hypothesis $\mu = 1.0$ against $\mu > 1.0$. and also construct 95% confidence limits. [10]

Unit-5

- 10 Test the hypothesis for the sample means are same are sample A is inferior to sample B for the following data at 5% level of significance [10]

Sample A	12	14	11	8	7	10	3	0	5	6
Sample B	15	16	10	7	5	12	10	2	3	8

(OR)

- 11 Test whether the two samples have same variance at 1% level of significance [10]

Sample I	74	77	74	74	73	
Sample II	70	74	74	70	69	72