O.P.Code: 23HS0832	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Regular & Supplementary Examinations November-2025

NUMERICAL & STATISTICAL METHODS

(Civil Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Write the formula to find the root of an equation by Regula Falsi method.	CO1	L1	2M
	b	Solve by Jacoby method [Only two iterations] $x+y=$; $x-2y=4$.	CO1	L3	2M
	c	Write Newton's forward interpolation formula.	CO2	L1	2M
	d	State the two normal equation used in fitting a straight line.	CO2	L1	2M
	e	Write Taylor's formula for $y(x_1)$ to solve $y' = f(x, y)$ with $y(x_0) = y_0$	CO3	L1	2M
	f	Find $y^{(1)}(x)$ by Picards's method , given that $\frac{dy}{dx} = 1 + xy; y(0) = 1.$	CO3	L1	2M
	g	Define Population and size of population.	CO5	L1	2M
	h	Define unbiased estimator.	CO5	L1	2M
	i	Define Large sample.	CO6	L1	2M
	j	Define alternate hypothesis.	CO6	L1	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	Find a real root of the equation xtanx+1=0 using Newton – Raphson method.	CO1	L1	10M

OR

3	Apply Gauss Siedel iteration method to solve equations $20x+y-2z=1$; $x+20y-z=-18; 2x-3y+20z=25$.	CO1	L3	10M

UNIT-II

4	Fit a second degree polynomial to the following data by method of least square	CO2	L3	10M

x	0	1	2	3	4
y	1	1.8	1.3	2.5	6.3

OR

5	Using Lagrange's interpolation formula, find the value of y(10) from the following table:	CO2	L3	10M

x	5	6	9	11
y	12	13	14	16

UNIT-III

6	Using modified Euler's method find (0.2) and $y(0.4)$, given $y' = y + e^x$, $y(0)=0$.	CO4	L3	10M

OR

7	Using Runge – Kutta method of fourth order, solve $\frac{dy}{dx} = x^2 - y, y(0) = 1$. Find y(0.1) and y(0.2).	CO4	L3	10M

UNIT-IV

8	a	The mean and the S.D of a population are 11,795 and 14054 respectively.If n = 50,Find 95% confidence intervals for the mean.	CO5	L4	6M
	b	Explain Errors of Sampling.	CO5	L3	4M

OR

9	a	It is claimed that a random sample of 49 tyres has a mean life of 15200 km. This sample was drawn from a population whose mean is 15150kms and standard deviation of 1200 km. Test the significance at 0.05 level.	CO5	L4	5M
	b	A sample of 400 items is taken from a population whose standard deviation is 10.The mean of the sample is 40. Test whether the sample has come from a population with mean 38. Also calculate 95% confidence interval for the population.	CO5	L4	5M

UNIT-V

10		To examine the hypothesis that the husbands are more intelligent than the wives, an investigator took a sample of 10 couples and administered them a test which measures the I.Q. The results are as follows:	CO6	L4	10M

Husbands	117	105	97	105	123	109	86	78	103	107
Wives	106	98	87	104	116	95	90	69	108	85

Test the hypothesis with a reasonable test at the level of significant of 0.05 and also calculate F-test.

OR

11	a	Find the maximum difference that we can expect with probability 0.95 between the mean of samples of sizes 10 and 12 from a normal population if their standard deviations are found to be 2 and 3 respectively.	CO6	L1	5M
	b	Samples of two types of electrical light blubs were tested for length of life and following data were obtained.	CO6	L2	5M

	Type 1	Type 2
Sample size	8	7
Sample mean	1234 hrs	1036 hrs
Sample S.D	36 hrs	40 hrs

Is the difference in the means sufficient to warrant that type I is superior to type II regarding length of life

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