

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Regular & Supplementary Examinations August-2023

NUMERICAL METHODS, PROBABILITY & STATISTICS

(Common to CE, AGE)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 Find real root of the equation $3x = e^x$ Using Bisection method. CO1 L3 12M

OR

- 2 From the following table values of x and $y = \tan x$. Interpolate the values of y when $x=0.12$ and $x=0.28$. CO1 L5 12M

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

UNIT-II

- 3 Using R-K method of 4th order find $y(0.1)$ and $y(0.2)$ given that $\frac{dy}{dx} = x + y, y(0) = 1$. CO2 L3 12M

OR

- 4 Evaluate $\int_0^1 \frac{1}{1+x} dx$ (i) by using Trapezoidal rule and Simpson's $\frac{1}{3}$ rule. CO2 L5 12M
(ii) Using Simpson's $\frac{3}{8}$ rule and compare the result with actual value.

UNIT-III

- 5 a Find the median to the following data CO3 L3 6M

Class intervals	40-50	50-60	60-70	70-80	80-90
frequency	5	12	23	8	2

- b Find arithmetic mean to the following data CO3 L3 6M

x	1	2	3	4	5
f	5	8	10	12	6

OR

- 6 In a certain college 25% of boys and 10% of girls are studying mathematics. CO4 L3 12M

The girls constitute 60% of the student body.

- (i) What is the probability that mathematics is being studied?
(ii) If a student is selected at random and is found to be studying mathematics, find the probability that the student is a girl?
(iii) If a student is selected at random and is found to be studying mathematics, find the probability that the student is a boy?

UNIT-IV

- 7 A random variable x has the following probability distribution function **CO5 L3 12M**

x	-3	-2	-1	0	1	2	3
$P(x)$	k	0.1	k	0.2	$2k$	0.4	$2k$

Find (i) k (ii) Mean (iii) Variance.

OR

- 8 Suppose a continuous random variable X has the probability density **CO5 L3 12M**

$$f(x) = \begin{cases} k(1 - x^2) & \text{when } 0 < x < 1 \\ 0 & ; \text{elsewhere} \end{cases}$$

Find (i) k (ii) Mean (iii) Variance.

UNIT-V

- 9 a Derive mean and variance of Binomial distribution. **CO5 L4 6M**

- b 20% of items produced from a factory are defective. Find the probability **CO5 L3 6M**
that in a sample of 5 chosen at random (i) one is defective
(ii) $P(1 < X < 4)$.

OR

- 10 Find two regression equations from the following data: **CO6 L3 12M**

X	10	25	34	42	37	35	36	45
Y	56	64	63	58	73	75	82	77

*** END ***