

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular & Supplementary Examinations December-2023
NUMERICAL METHODS, PROBABILITY & STATISTICS
(Mechanical Engineering)

Time: 3 Hours**Max. Marks: 60**

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

UNIT-I

- 1 a Define Algebraic equation and Transcendental equation. CO2 L1 2M
 b Find a positive root of the equation $x^3 - x - 1 = 0$ by Bisection method. CO2 L3 10M

OR

- 2 Find the root of the equation $x \log_{10}(x) = 1.2$ using False position method. CO1 L3 12M

UNIT-II

- 3 Using modified Euler's method find $y(0.2)$ and $y(0.4)$, given $y' = y + e^x$, $y(0) = 0$ CO3 L3 12M

OR

- 4 Using R-K method of 4th order find $y(0.1)$ and $y(0.2)$ given that $\frac{dy}{dx} = x + y$, $y(0) = 1$. CO3 L3 12M

UNIT-III

- 5 a Find mode to the following data: L1 CO4 6M

X	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
F	5	7	10	18	20	12	8	2

- b Find the median to the following data. L1 CO4 6M

x	5	8	11	14	17	20	23
f	2	8	12	20	10	6	3

OR

- 6 a State Baye's theorem. L1 CO4 2M
 b In a certain college 25% of boys and 10% of girls are studying mathematics. 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) a boy?

UNIT-IV

- 7 a Describe Discrete random variable. **L2 CO5 2M**
 b A random variable x has the following probability distribution function **L3 CO5 10M**

x	1	2	3	4	5	6	7	8
$P(x)$	k	$2k$	$3k$	$4k$	$5k$	$6k$	$7k$	$8k$

Find i) k ii) $P(X \leq 2)$ iii) $P(2 \leq x \leq 5)$.

OR

- 8 If the probability density function $f(x) = \begin{cases} k(3x^2 - 1), & \text{in } -1 \leq x \leq 2 \\ 0, & \text{elsewhere} \end{cases}$, then **L1 CO5 12M**
 (i) Find the value of k . (ii) Find the probability $(-1 \leq x \leq 0)$

UNIT-V

- 9 Out of 800 families with 5 children each, how many would you expect to **L2 CO5 12M**
 have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys iv) At least one boy

OR

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

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

***** END *****