

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

**B.Tech II Year II Semester Supplementary Examinations May/June-2024**  
**NUMERICAL METHODS, PROBABILITY & STATISTICS**

(Common to CE, ME, & AGE)

**Time: 3 Hours**

**Max. Marks: 60**

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

**UNIT-I**

- 1 Find a positive root of  $f(x) = e^{-x} - 3$  correct to two decimal places by Bisection method. CO1 L1 12M

OR

- 2 a Using Newton's forward interpolation formula and the given table of values CO1 L1 6M

$x$	1.1	1.3	1.5	1.7	1.9
$f(x)$	0.21	0.69	1.25	1.89	2.61

Obtain the value of  $f(x)$  when  $x=1.4$ .

- b Use Newton's backward interpolation formula to find  $f(32)$  given  $f(25)=0.2707$ ,  $f(30)=0.3027$ ,  $f(35)=0.3386$ ,  $f(40)=0.3794$ . CO1 L1 6M

**UNIT-II**

- 3 Tabulate  $y(0.1)$ ,  $y(0.2)$  and  $y(0.3)$  using Taylor's series method given that  $y' = y^2 + x$  and  $y(0) = 1$ . CO2 L6 12M

OR

- 4 Evaluate  $\int_0^1 \frac{1}{1+x} dx$  (i) by 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 L1 6M

<i>Class Intervals</i>	40-50	50-60	60-70	70-80	80-90
<i>Frequency</i>	5	12	23	8	2

- b Find arithmetic mean to the following data CO3 L1 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. The girls constitute 60% of the student body. CO3 L6 12M  
(a) What is the probability that mathematics is being studied?  
(b) If a student is selected at random and is found to be studying mathematics, find the probability that the student is a girl?  
(c) a boy.

**UNIT-IV**

- 7 Two dice are thrown. Let  $X$  assign to each point  $(a, b)$  in  $S$  the maximum of its numbers i.e.,  $X(a, b) = \max(a, b)$ . Find the probability distribution.  $X$  is a random variable with  $X(s) = \{1, 2, 3, 4, 5, 6\}$ . Also find the mean and variance of the distribution. CO4 L1 12M

OR

- 8 For the continuous probability function  $f(x) = \begin{cases} kx^2 e^{-x}; & \text{when } x \geq 0 \\ 0; & \text{elsewhere} \end{cases}$  CO4 L1 12M  
Find (i)  $k$  (ii) Mean (iii) Variance.

**UNIT-V**

- 9 Fit a Binomial distribution to the following frequency distribution: CO5 L5 12M

$x$	0	1	2	3	4	5
$f$	2	14	20	34	22	8

OR

- 10 Find two regression equations from the following data: CO5 L1 12M

$x$	10	25	34	42	37	35	36	45
$f$	56	64	63	58	73	75	82	77

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