Q.P. Code: 20HS0833 **R20**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Regular & Supplementary Examinations March-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 Find real root of the equation $3x = e^x$ by Bisection method. **CO1 L2 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 L2 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 Solve $y^1 = x+y$, given y (1)=0 find y(1.1) and y(1.2) by Taylor's series method. **CO2 L2 12M**

OR

4 Evaluate $\int_0^1 \frac{1}{1+x} dx$ by **CO2 L2 12M**

(i) Trapezoidal rule and Simpson's $\frac{1}{3}$ rule.

(ii) Using Simpson's $\frac{3}{8}$ rule and compare the result with actual value.

UNIT-III

5 a State and prove Addition theorem of probability **CO3 L1 6M**

b In a certain town 40% have brown hair, 25% have brown eyes and 15% have both brown hair and brown eyes. A person is selected at random from the town. **CO3 L2 6M**
i) If he has brown hair, what is the probability that he has brown eyes also?
ii) If he has brown eyes, determine the probability, that he does not have brown hair?

OR

6 a State Baye's theorem. **CO3 L1 2M**

b Determine (i) $P\left(B/A\right)$ (ii) $P\left(A/B^C\right)$ if A and B are events with $P(A) = \frac{1}{3}$ $P(B) = \frac{1}{4}$, $P(AUB) = \frac{1}{2}$. **CO3 L2 10M**

UNIT-IV

7 A random variable X has the following probability function. CO4 L2 12M

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine (i) K (ii) Mean iii) variance
(iv) if $P(X \le K) > 1/2$, find the Minimum value of K

OR

8 For the continuous probability function $f(x) = \begin{cases} kx^2e^{-x} \text{ when } x \ge 0 \\ 0 \text{ ; elsewhere} \end{cases}$ CO4 L3 12M

Find i) k ii) Mean iii) Variance

UNIT-V

9 **a** If 2% of light bulbs are defective. Find the probability that (i) At least one is defective (ii) $P(1 < x < 8)$ in a sample of 100. CO5 L3 6M

b If for a Poisson variate 2P(X=0)=P(X=2) Find the probability that i) $P(X \le 3)$ ii) $P(2 < X \le 5)$ iii) $P(X \ge 3)$. CO5 L3 6M

OR

10 Calculate Correlation coefficient to the following data CO5 L3 12M

X	10	15	12	17	13	16	24	14	22	20
Y	30	42	45	46	33	34	40	35	39	38

*** END ***