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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations November-2022

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 a real root of the equation $xe^x - \cos x = 0$ using Newton – Raphson method. **L1** **12 M**

OR

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

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 Euler's method, find an approximate value of y corresponding to $x = 0.3$ given that $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 0$ taking step size $h = 0.1$. **L1** **12 M**

OR

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

UNIT-III

5 Compute the first four central moments to the following data and also find Sheppard's correction, β_1 and β_2: **L6** **12 M**

Class intervals	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	2	8	12	40	20	15	3

OR

6 In a certain college 25% of boys and 10% of girls are studying mathematics. The girls Constitute 60% of the student body. (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? **L6** **12 M**

UNIT-IV

7 **a** If the probability density function is $f(x)=\begin{cases}k(3x^2-1), in -1\le x\le 2\\ 0, elsewhere\end{cases}$. Then (i) find the value of k. (ii) find the probability (-1≤x≤0). **L1** **6M**

b If the probability density function of a random variable x is $f(x)=\begin{cases}kx(x-1); 1\le x\le 4\\ 0\ ; elsewhere\end{cases}$ and $P(1\le x\le 3)=\frac{28}{3}$. Then find the value of k. **L6** **6M**

OR

8 If a random variable x has the following probability distribution function: **L6** **12 M**

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.

UNIT-V

9 Fit a Poisson distribution to the following data: **L5** **12 M**

x	0	1	2	3	4	5	Total
f	142	156	69	27	5	1	400

OR

10 Calculate Correlation coefficient to the following data: **L5** **12 M**

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

*** END ***