SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year II Semester Regular& SupplementaryExaminations June-2024
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 a real root of the equation $xe^x - \cos x = 0$, using Newton – Raphson method.	CO1 L3	12M

OR

2 a Using Newton's forward interpolation formula and the given table of values   CO1 L3 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   CO1 L3 6M

$f(25)=0.2707, f(30)=0.3027, f(35)=0.3386, f(40)=0.3794.$

UNIT-II

3 Using R-K method of 4th order, solve $\frac{dy}{dx} = x^2 - y$, $y(0) =1$. Find $y(0.1)$ and $y(0.2)$.   CO2 L2 12M

OR

4 a Compute $\int_0^4 e^x dx$ by Simpson's $\frac{3}{8}$ rule with 12 sub divisions.   CO2 L5 6M

b Compute $\int_0^{\pi/2} sinx \, dx$ using Trapezoidal rule, Simpson's $\frac{1}{3}$ ruleand compare with exact value.   CO2 L5 6M

UNIT-III

5 Calculate the first four central moments to the following data and also find Sheppard's correction, β_1 and β_2 CO3 L3 12M

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   Two dice are thrown. Let A be the event that the sum of the point on the faces is 9. Let B be the event that at least one number is 6.   **CO4**   **L3**   **12M**

Find *(i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(A^c \cup B^c)$ (iv) $P(A^c \cap B^c)$*

(v) $P(A \cap B^c)$.

UNIT-IV

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

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≤2) iii) P(2≤ x ≤5).

OR

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

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

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: **CO6**   **L3**   **12M**

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

*** END ***