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Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE) PT (Sem.–6)

NUMERICAL AND STATISTICAL METHODS

Subject Code : BTEE-505

Paper ID : [72790]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) Find the area A under the standard normal curve to the left of $z = -1.78$.

b) A fair die is tossed 5 times. Find the probability of never getting a 5.

c) Find the value of $F_{0.96}$ for $v_1 = 16$ and $v_2 = 20$

d) Find $P(-t_{0.025} < t < t_{0.021})$

e) If the number p is correct to 3 significant digits, what is the maximum relative error?

f) State Newton's divided difference interpolation formula.

g) Define a cumulative probability distribution function.

h) What do you understand by the sampling distribution of the mean?

i) Define a random variable.

j) State two properties of an Exponential distribution.

SECTION-B

2. Find a root of $x^3 - 4x - 9 = 0$ using the bisection method correct to three decimal places.

3. Construct Newton's forward interpolation polynomial for the following data:

x	4	6	8	10
y	1	3	8	16

4. Using Taylor series expansion evaluate the integral of $y' - 2y = 3e^x$, $y(0) = 0$ at $= 0.1, 0.2$.

5. If X is uniformly distributed in [a, a] with a > 0 then determine a such that P(X > 1) = 1/3.

6. A machine runs on an average of 125 hours/year. A random sample of 49 machines has an annual average use of 126.9 hours with standard deviation 8.4 hours. Does this suggest to believe that machines are used on an average more than 125 hours annually at 0.05 level of significance?

SECTION-C

7. Determine the largest eigen value and the corresponding eigen vector of the matrix

$$A = \begin{bmatrix} -3 & 2 & 1 \\ 1 & -2 & 1 \\ 1 & 2 & -3 \end{bmatrix}.$$

8. Using Runge – Kutta method of fourth order, solve $\frac{dy}{dx} = x + y, y(0) = 1$ at $x = 0.2, 0.4$.

9. Fit a least square parabola to the following data :

x	0.0	0.2	0.4	0.6	0.8	1.0
y	1.016	0.768	0.648	0.401	0.272	0.193