**Reg. No:**

## SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
### (AUTONOMOUS)
**B.Tech II Year I Semester Supplementary Examinations December-2021**
### PROBABILITY & STATISTICS
(Common to ME, CSE & CSIT)

Time: 3 hours                                                 Max. Marks: 60

### PART-A
(Answer all the Questions **5 x 2 = 10** Marks)

| | | | | |
|---|---|---|---|---|
| 1 | a | If $P(A)=\dfrac{1}{2}$, $P(B)=\dfrac{1}{4}$ $P(A \cap B)=\dfrac{1}{8}$ then $P(A \cup B)$ | L2 | 2M |
| | b | Define Binomial distribution | L2 | 2M |
| | c | Find the median of the following values 26,8,6,12,15,32. | L2 | 2M |
| | d | write normal equations to $y=ax+b$ | L2 | 2M |
| | e | Define Chi-square test | L1 | 2M |

### PART-B
(Answer all Five Units 5 x 10 = 50 Marks)
#### UNIT-I

2   a   A class consists of 6 girls and 10 boys. If a committee of 3 is chosen at random from the class, find the Probability that (i)3 boys are selected (ii)exactly 2 girls are selected    L2   5M

    b   Determine (i) $P\left(B/A\right)$ (ii) $P\left(A/B^C\right)$ ,if A and B are events with $P(A)=\dfrac{1}{3}$, $P(B)=\dfrac{1}{4}$ , $P(A \cup B)=\dfrac{1}{2}$.    L2   5M

**OR**

3   A random variable X has the following probability function             L2   10M

| 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) Evaluate $P(X \geq 6)$ and $P(0<X<5)$ (iii) if $P(X \leq K)>1/2$, find the minimum value of K (iv) variance.

#### UNIT-II

4   a   Fit a Binomial distribution to the following frequency distribution:          L2   8M

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

    b   The mean and variance of a binomial distribution are 4 and $\dfrac{4}{3}$. Find $p(X \geq 1)$.    L2   2M

**OR**

5   Derive mean and variance of Normal distribution.                     L1   10M

#### UNIT-III

6   a   Find the median to the following data                          L2   5M

| Class intervals | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 |
|---|---|---|---|---|---|
| frequency | 5 | 12 | 23 | 8 | 2 |

**b** Find arithmetic mean to the following data     L2   5M

| x | 1 | 2 | 3 | 4 | 5 |
|---|---|---|----|----|---|
| f | 5 | 8 | 10 | 12 | 6 |

**OR**

7 Calculate the correlation coefficient for the following heights(in inches) of fathers(X) and their sons(Y)    L2   10M

| X | 65 | 66 | 67 | 67 | 68 | 69 | 70 | 72 |
|---|----|----|----|----|----|----|----|----|
| Y | 67 | 68 | 65 | 68 | 72 | 72 | 69 | 71 |

## UNIT-IV

8 Fit a parabola to the data given below     L2

| x | 1 | 2 | 3 | 4 | 5 |
|---|----|----|---|----|----|
| y | 10 | 12 | 8 | 10 | 14 |

10M

**OR**

9 **a** A sample of 400 items is taken from a population whose standard deviation is 10. The mean of the sample is 40.Test whether the sample has come from a population with mean 38.    L2   5M

   **b** The means of two large samples of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of standard deviation 2.5 inches.    L2   5M

## UNIT-V

10 A random sample of 10 boys had the following I.Q's : 70,120,110,101,88,83,95,98,107 and 100 i) Do these data support the assumption of a population mean I.Q of 100?
ii) Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie.    L2   10M

**OR**

11 **a** Find the maximum difference that we can expect with probability 0.95 between the mean of samples of sizes 10 and 12 from a normal population if their standard deviations are found to be 2 and 3 respectively.    L2   5M

   **b** The number of automobile accidents per week in a certain community are as follows: 12, 8, 20, 2, 14, 10, 15, 6, 9, 4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10 week period.    L2   5M

***END***