**Code No. BS303HS**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY (An Autonomous Institution)**

**B.E. (CSE/AI&DS) III-Semester (AICTE) (Regular) Examination, Feb -2023**

**Subject: PROBABILITY & STATISTICS**

**Time:3hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.**

1. a) Write the axioms of probability. **10x2=20M**

b) If x is a random variable with probability function f(x) =ke-5x, x>0, then find k.

c) Five coins are tossed simultaneously .what is the probability of getting at least one

 head

d) Explain Skewness and Kurtosis.

e) Find Mean of Uniform distribution.

f) Give any three properties of the Normal Distribution.

g) Write the formula for Spearman’s rank coeffient of correlation.

h) Explain the Null and Alternative Hypothesis

i) Write the properties of t-distribution.

J) Write the normal equation of Second degree parabola.

 **PART-B**

 **(ANSWERANY FIVE)** **8X5=40M**

1. a) State and prove Probability Addition theorem. (4+4)

b) An Integer chosen random from the first 200 positive integer’s .What

 is the probability that the integer chosen is divisible by 6 or 8?

 3. a) Derive mean and variance of Binomial Distribution. (5+3)

 b) Average number of accidents on any day on a national highway is 1.8.. Determine the probability that the number of accidents are (i) at least one (ii) at most one.

4.a) Derive Moment generating function of Normal distribution. (5+3)

 b) Find Mean deviation about the mean of normal distribution.

5. Calculate the coefficient of correlation and regression lines y on x and x on y from the (8)

 following data.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| X | 12 | 9 | 8 | 10 | 11 | 13 | 7 |
| Y | 14 | 8 | 6 | 9 | 11 | 12 | 3 |

6. Two random Samples are drawn from 2 Populations and the following results are obtained

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sample I | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Sample II | 12 | 17 | 18 | 22 | 27 | 23 | 32 | ---- | ------ |

Find the Variance of the two Samples and Test whether the Two Populations have the same variance at 5% L O S { F0.05(8,6)= 4.15} (8)

7. Fit a curve of the form $y=a+bx $to the following data (8)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  x | 1 | 2 | 3 | 4 | 5 |
| y | 2 | 5 | 9 | 14 | 19 |

8.a) State and Prove Baye’s theorem. (5+3)

 b) In a bolt factory machines A, B,C manufacture 20%, 30% and 50% of the total of their

 output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be

 defective. Find the probabilities that it is manufactured from Machine A.

9. Calculate the first four moments of the following distribution about the point and hence

 find β1 and β2 also comment on the nature of the distribution. (8)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| F | 1 | 8 | 28 | 56 | 70 | 56 | 28 | 8 | 1 |

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