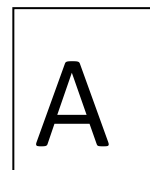Reg.No: 

# SNS College of Technology, Coimbatore-35.
## (An Autonomous Institution)
### Internal Assessment -I
### Academic Year 2022-2023(Even)
### Third Semester
### Department of Mathematics
#### 19MAT204 - Probability and Statistics

**A**

**Time: 1.30 Hours**　　　　　　　　　　　　　　　　　　　　**Maximum Marks: 50**

| | | PART – A (5 x 2 = 10 MARKS) ANSWER ALL QUESTIONS | | BLOOMS |
|---|---|---|---|---|
| 1. | | Define independent variable and give one example. | CO1 | (Rem) |
| 2. | | If P(A) = 0.4, P(B) = 0.7, $P(A \cap B) = 0.3$, compute $P(\overline{A} \cap \overline{B})$ & $P(\overline{A} \cup \overline{B})$ | CO1 | (Rem) |
| 3. | | If a R.V X has the MGF $M_x(t) = \dfrac{3}{3-t}$ , obtain the mean. | CO1 | (Und) |
| 4. | | Find the Binomial distribution if X is a Binomial variate with mean is 4 and variance is 4 . | CO1 | (Und) |
| 5. | | If 3% of the electric bulbs manufactured by a company are defective, find the probability that in a sample 100 bulbs exactly 5 bulbs are defective. | CO2 | (Und) |
| | | **PART –B (2 × 13=26 MARKS)** **ANSWER ALL QUESTIONS** | | |
| 6. | a)i) ii) | If A and B are independent events, prove that $\overline{A}$ and B are independent. (b) A and $\overline{B}$ are independent A random variable X has the following probability function X　　0　1　2　3　4　5　6　7　8 P(X)　a　3a　5a　7a　9a　11a　13a　15a　17a Find  (i) Determine the value of 'a' 　　(ii) Find P(X<3), P(0<X<5), $p(x \geq 3)$ 　　(iii) Find the distribution function of X. | CO1 CO1 | (App) (7) (App) (6) |
| | | (or) | | |
| | b) | If a density function of a continuous R.V 'X' is given by | CO1 | (Ana) (13) |

| | | $$f(x) = \begin{cases} ax\,, & 0 < x < 1 \\ a\,, & 1 < x < 2 \\ 3a - ax, & 2 < x < 3 \\ 0\,, & oterwise \end{cases}$$ Find (i) the value of 'a' <br><br> (ii)P(X < 1.5) <br><br> (ii) Cumulative Distribution | | |
|---|---|---|---|---|
| **7.** | a) | Derive the MGF of Binomial distribution and hence find its mean and Variance. | CO2 | (App) (13) |
| | | (or) | | |
| | b) (i) <br><br><br> (ii) | If a Random variable X takes values X 1 2 3 4 such that <br><br> 2P(X=1) = 3P(X=2) = P(X=3) = 5P(X=4). Find probability mass function and mean, variance. <br><br> The number of monthly breakdown of computer is a random variable having passion distribution with mean equal to 1.8. Find the probability that this compute will function for a month(a) without breakdown (b) with at least one breakdown. | CO2 | (Ana) (13) |
| **8.** | a) | In bolt factory machines A, B, C manufactures respectively 25%, 35% and 40% of the total of their output 5%, 4%, 2% are defective bolts. A bolt is drawn at random from the product and is found to be Defective. What are the probabilities that it was manufactured by machines B and C? | CO1 | (Ana) (7) |
| | | (or) | | |
| | b) i) <br><br><br> ii) | Find the Moment Generating Function of the random variable with the Probability law $P(X=x) = q^{x-1}p, x = 1,2...$ Find mean & variance. <br><br> If 10 percent of the screws produced by an automatic machine are defective. Find the probability that of 20 screws selected at random. there are (i) exactly two defective (ii) at most three defectives (iii) between three defectives. | CO2 <br><br><br> CO2 | (App) (7) <br><br><br> (App) (7) |

**Rem/Und:** Remember/ Understand     **App:** Apply     **Ana:** Analyze     **Eva:** Evaluate     **Cre:** Create


Prepared by                 Verified by          Dean(S&H)