SASTRA
DEEMED TO BE UNIVERSITY

School of Arts Science &Humanities
First CIA – November 2022
Course Code: MAT 123
Course Name: Probability and Statistics
Duration: 90 minutes
Max Marks: 50

Answer all the questions. **PART A** 10 x 2 = 20 Marks

1.	If four squares are chosen at random on a chess board, find the chance that they should be in a diagonal.
2.	Suppose cards numbered one through ten are placed in a hat, mixed up and then one of the cards is drawn. If we are told that the number on the drawn card is at least three, then what is the conditional probability that it is nine?
3.	If A and B are independent events then prove that $\bar{A}$ and $\bar{B}$ are independent.
4.	The number of tosses of a coin that are needed so that the probability of getting at least one head being 0·875 is
5.	With the usual notations , find p for a binomial variate X, if $n = 6$ and $9P(X = 4) = P(X = 2)$.
6	X is a normal variate with mean 30 and standard deviation 5.Find the probability of $P(\|X - 30\| > 5)$.
7	A random variable X has uniform distribution over $(-3,3)$ find k for which $P(X > k) = \frac{1}{3}$
8	Define Poisson Distribution
9	State Bayes Theorem
10	Subway trains on a certain line run every half an hour between mid-night and six in the morning. what is the probability that a man entering the station at a random time during this period will have to wait atmost 10 minutes.

Answer all the questions. **PART B** **3 x 10 = 30 marks**

11	There are two bags A and B. A contains n white and 2 black and B contains 2 white and n black balls. One of the two bags is selected at random and two balls drawn from it without replacement. If both the balls drawn are white and probability that the bag A was used to draw the ball is $\frac{6}{7}$. Find the value of n.

12	The marks of the students in a certain examination are normally distributed with mean marks as 40% and standard deviation, marks as 20%. On this basis, 60% students failed. The result was moderated and 70% students passed. Find the pass marks before and after the moderation.

13	Three groups of children contain respectively 3 girls and 1 boy, 2 girls and 2 boys and 1 girl 3 boys.One child is selected at random from each group. Find the probability that the three selected consist of 1 girl 2 boy.