Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

THIRD SEMESTER INTEGRATED M.C.A DEGREE EXAMINATION (S), FEBRUARY 2024

(2020 SCHEME)

Course Code: **20IMCAT203**

Course Name: **Probability and Statistics**

Max. Marks: **60** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Find the mean of first ten even positive integers.
2. Define relative measures of dispersion. What are the advantages of relative measures of dispersion?
3. From a deck of 52 playing cards a hand of 8 cards is to be taken. How many possibilities are there in making this hand of 8?
4. State rules of sum and product of two sets .
5. Define random experiment with an example.
6. If P(A) =2/5, P(B) =3/8 find P(A∪B) when A and B are independent.
7. Can the following be a probability mass function? Give reason.

$$g(x) = \begin{cases} \frac{1}{2}; for\ x = 2 \\ \frac{2}{3}; for\ x = 0 \\ \frac{1}{4}; for\ x = 2 \\ 0;\ elsewhere \end{cases}$$

8. Define distribution function of a discrete random variable. Mention any two properties of distribution function.
9. Derive the mean of exponential distribution
10. Find the value of k so that f(x) = kx (1-x) ; $0 < x < 1$ is a pdf.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

11. Find the missing frequencies of the following data of 100 observations with mean 87 (6)

X	52	66	73	89	95	101	114	122	Total
Frequency	5	15	-------	17	-------	12	11	4	100

OR

12. Calculate median from the following data (6)

Marks	0-10	10-30	30-60	60-80	80-90
No. of Students	5	15	30	8	2

MODULE II

13. How many different number plates can be made containing only three digits if (i) repetition of numbers allowed (ii) no repetition is allowed (6)

OR

14. a) A committee of 5 people is to be formed consisting of 3 women and 2 men. There are 10 men and 5 women are available for selection. In how many ways can this committee be formed. (3)
    b) If a coin is tossed three times. Write down all possible sequences of head H and tails T. (3)

MODULE III

15. a) If A and B are independent events, show that A' and B' are independent. (3)
    b) State the axiomatic definition of probability. (3)

OR

16. State and prove Bayes' theorem in probability. (6)

MODULE IV

17. Consider the pmf of X f(x) = x/15; x = 1, 2, 3, 4, 5 and zero elsewhere. Find its distribution function. (6)
Also obtain P(1 < X < 2) and P(X>0)

OR

18. Define binomial distribution. Derive its mean and variance. (6)

MODULE V

19. A continuous random variable X has the following density function (6)

$$f(x) = \begin{cases} ax & ; \ for\ 0 < x < 1 \\ 0 & ; \ for\ 1 < x < 2 \\ -ax + 3a & ; \ for\ 2 < x < 3 \\ 0 & ; \ elsewhere \end{cases}$$

(1) Determine the constant a,
(2) Find the distribution function,

OR

20. Define Normal distribution. State any 3 properties of it. (6)

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