CHAPTER - 8 – STATISTICS AND PROBABILITY

I. Answer the Following (2 marks)

1. Find the range and coefficient of range of the following data: 25, 67, 48, 53, 18, 39, 44.

2. Find the range of the following distribution.

Age (in years)	16-18	18-20	20-22	22-24	24-26	26-28
Number of students	0	4	6	8	2	2

3. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

4. Find the range and coefficient of range of the following data. 43.5, 13.6, 18.9, 38.4, 61.4, 29.8

5. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.

6. Find the standard deviation of first 21 natural numbers.

7. If the standard deviation of a data is 4.5 and if each value of the data is decreased by 5, then find the new standard deviation.

8. If the standard deviation of a data is 3.6 and each value of the data is divided by 3, then find the new variance and new standard deviation.

9. The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation.

10. The following table gives the values of mean and variance of heights and weights of the 10th standard students of a school.

	Height	Weight
Mean	155 cm	46.50 kg
Variance	72.25 cm^2	28.09 kg

Which is more varying than the other?

11. The standard deviation and mean of a data are 6.5 and 12.5 respectively. Find the coefficient of variation.

12. The standard deviation and coefficient of variation of a data are 1.2 and 25.6 respectively. Find the value of mean.

13. If the mean and coefficient of variation of a data are 15 and 48 respectively, then find the value of standard deviation.

14. Two coins are tossed together. What is the probability of getting different faces on the coins?

15. In a box there are 20 non-defective and some defective bulbs. If the probability that a bulb selected at random from the box found to be defective is $\frac{3}{8}$ then, find the number of defective bulbs.

16. If P(A) = 0.37, P(B) = 0.42, P(A∩B) = 0.09 then find P(A∪B).

17. If A and B are two events such that P (A)= $\frac{1}{4}$ P(B) = $\frac{1}{2}$ and P (A and B) = $\frac{1}{8}$

    Find (i) P (A or B)   (ii) P (not A and not B).

18. A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is atmost 0.8.

19. If P(A) = $\frac{2}{3}$, P(B) = $\frac{2}{5}$, P(A∪ B) = $\frac{1}{3}$ then find P(A∩ B).

20. If A and B are two mutually exclusive events of a random experiment and P(not A) = 0.45, P(A∪ B) = 0.65 , then find P(B).

II. Answer the Following (3 marks)

1. The number of televisions sold in each day of a week are 13, 8, 4, 9, 7, 12, 10. Find its standard deviation.

2. The marks scored by 10 students in a class test are 25, 29, 30, 33, 35, 37, 38, 40, 44, 48. Find the standard deviation.

3. For a group of 100 candidates the mean and standard deviation of their marks were found to be 60 and 15 respectively. Later on it was found that the scores 45 and 72 were wrongly entered as 40 and 27. Find the correct mean and standard deviation.

4. The mean and variance of seven observations are 8 and 16 respectively. If five of these are 2, 4, 10, 12 and 14, then find the remaining two observations.

5. If $n = 5, \bar{x} = 6, \sum x^2 = 765$, then calculate the coefficient of variation.

6. Express the sample space for rolling two dice using tree diagram.

7. Two dice are rolled. Find the probability that the sum of outcomes is

   (i) equal to 4   (ii) greater than 10   (iii) less than 13.

8. A bag contains 6 green balls, some black and red balls. Number of black balls is as twice as the number of red balls. Probability of getting a green ball is thrice the probability of getting a red ball. Find (i) number of black balls (ii) total number of balls.

9. A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the numbers 1, 2, 3, …12. What is the probability that it will point to

   (i) 7 (ii) a prime number   (iii) a composite number?

10. If A is an event of a random experiment such that $P(A) : P(\bar{A}) = 17:15$ and n(S)=640 then find

    (i) $P(\bar{A})$ (ii) n(A).

11. A coin is tossed thrice. What is the probability of getting two consecutive tails?

12. A bag contains 12 blue balls and x red balls. If one ball is drawn at random (i) what is the probability that it will be a red ball? (ii) If 8 more red balls are put in the bag, and if the probability of drawing a red ball will be twice that of the probability in (i), then find x.

13. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that

    (i) The student opted for NCC but not NSS.

    (ii) The student opted for NSS but not NCC.

    (iii)The student opted for exactly one of them.

14. The probability that atleast one of A and B occur is 0.6. If A and B occur simultaneously with probability 0.2, then find $P(\bar{A}) + P(\bar{B})$

15. Two dice are rolled once. Find the probability of getting an even number on the first die or a total of face sum 8.

16. From a well-shuffled pack of 52 cards, a card is drawn at random. Find the probability of it being either a red king or a black queen.

III. Answer the Following (5 marks)

1. The marks scored by the students in a slip test are given below. Find the standard deviation of their marks.

x	4	6	8	10	12
f	7	3	5	9	5

2. Marks of the students in a particular subject of a class are given below. Find its standard deviation.

| Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of students	8	12	17	14	9	7	4

3. Find the variance and standard deviation of the wages of 9 workers given below: ₹310, ₹290, ₹320, ₹280, ₹300, ₹290, ₹320, ₹310, ₹280.

4. In a study about viral fever, the number of people affected in a town were noted as Find its standard deviation.

Age in years	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of people affected	3	5	16	18	12	7	4

5. Find the coefficient of variation of 24, 26, 33, 37, 29, 31.

6. The total marks scored by two students Sathya and Vidhya in 5 subjects are 460 and 480 with standard deviation 4.6 and 2.4 respectively. Who is more consistent in performance?

7. From a well shuffled pack of 52 cards, one card is drawn at random. Find the probability of getting
   (i) red card (ii) heart card (iii) red king (iv) face card (v) number card

8. Two unbiased dice are rolled once. Find the probability of getting
   (i) a doublet (equal numbers on both dice) (ii) the product as a prime number
   (iii) the sum as a prime number (iv) the sum as 1

9. Three fair coins are tossed together. Find the probability of getting
   (i) all heads (ii) atleast one tail (iii) atmost one head (iv) atmost two tails

10. Some boys are playing a game, in which the stone thrown by them landing in a circular region (given in the figure) is considered as win and landing other than the circular region is considered as loss. What is the probability to win the game? ($\pi = 3.14$)
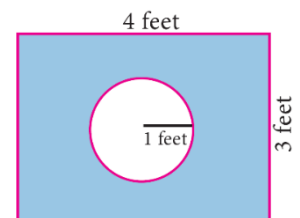
11. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.

12. A box contains cards numbered 3, 5, 7, 9, … 35, 37. A card is drawn at random from the box. Find the probability that the drawn card have either multiples of 7 or a prime number.

13. In a town of 8000 people, 1300 are over 50 years and 3000 are females. It is known that 30% of the females are over 50 years. What is the probability that a chosen individual from the town is either a female or over 50 years?

14. A, B, C are any three events such that probability of B is twice as that of probability of A and probability of C is thrice as that of probability of A and if $P(A \cap B) = \frac{1}{6}$, $P(B \cap C) = \frac{1}{4}$, $P(A \cap c) = \frac{1}{8}$, $P(A \cup B \cup C) = \frac{9}{10}$, $P(A \cap B \cap C) = \frac{1}{15}$, then find $P(A)$, $P(B)$ and $P(C)$?

15. In a class of 35, students are numbered from 1 to 35. The ratio of boys to girls is 4:3. The roll numbers of students begin with boys and end with girls. Find the probability that a student selected is either a boy with prime roll number or a girl with composite roll number or an even roll number.