5. Probability

Q.1 (A) There are four alternative answers for each of the following subquestions. Choose the correct alternative answer for each of the following questions and write the alphabet. (1 mark question)

1) Which of the following number cannot represent a probability?

A) 0.66   B) 1.5   C) 0.15   D) 0.7

2) If n(A) = 5 , P(A)=$\frac{1}{2}$ then n($\mathbf{S}$) = ?

A) 10   B) $\frac{3}{5}$ C) $\frac{4}{5}$ D) $\frac{1}{3}$

3) When a dice is thrown the number of sample points in the sample space are

....

A) 4   B) 6   C) 2   D) 52

4) In how many ways a card can be drawn from a well shuffled pack of playing cards,

A) 4   B) 1   C) 26   D) 52

5) What is the probability of the event that a number chosen from 1 to 50 is a   prime number ?

A) $\frac{3}{10}$ B) $\frac{1}{2}$ C) $\frac{1}{4}$ D) $\frac{3}{25}$

6) Which of the following options shows the highest probability.

A) $\frac{4}{5}$ B) 0.83   C)% 58   D) $\frac{1}{2}$

7) When two dice are thrown the number of sample points in the sample space are

....

A) 6   B) **12**   C) 36   D) 52

Q.1 (B) Solve the following sub-questions. (1 mark question)

1) Write a sample space if two coins are tossed simultaneously.

2) Write a sample space when a die is thrown.

3) In a set of 25 cards, each card bears only one number from 1 to 25. One card is drawn randomly. Write the sample space for this random experiment?

4) A two digit number is formed with digits 2, 3, 5 without repetition, Write the sample space?

5) write the event in the set form for the following random experiment.

' If one die is thrown, the number obtained on the upper face is even.'

Q.2 (A) Complete the following activity. (2 marks question)

1) If one die is rolled then find the probability of the following event by completing the activity.

   Event A: Number on the upper face is prime.

Activity :   Let   'S' is the sample space.

$$S = \{1, 2, 3, 4, 5, 6\} \quad \therefore n(S) = 6$$

Event A : Prime number on the upper face.

$$A = \{ \ldots\ldots\ldots\ldots\} \qquad\qquad \therefore \ n(A) = 3$$

$$P(A) = \frac{\square}{n(S)} \qquad \ldots\ldots\ldots\ldots \text{(Formula)}$$

$$= \frac{\square}{6}$$

$$\therefore P(A) = \frac{1}{\square}$$

2)   Two coins are tossed simultaneously. Write the sample space (S) and expected sample points in the given events by completing the activity.

   i) Event A : to get at least one head.

   ii) Event B : to get no head.

Activity : Let 'S' is the sample space , when two coins are tossed simultaneously.

$$\therefore \quad S = \{ \square, HT, TH, \square \}$$

Event A : to get at least one head.

$$\therefore A = \{ HH, \square, TH \}$$

Event B : to get no head.

$$\therefore B = \{ \square \}$$

3)   A card is drawn from a well shuffled pack of 52 playing cards. Find the probability of i) Event A : Card drawn is a red card.

Activity :   Let   'S' is the sample space. $\therefore n(S) = 52$

Event A : Card drawn is a red card.

$$\therefore \text{ Total red cards} = (\ \ ) \text{ hearts} + 13 \text{ diamonds}$$

$$\therefore \quad n(A) = (\ \ )$$

$$\therefore P(A) = \frac{\square}{n(S)} \qquad\qquad \ldots\ldots\ldots\ldots \text{ Formula}$$

$$P(A) = \frac{26}{52}$$

$$P(A) = \square$$

4)   In Adarsh High School , out of 30 students in a class 3 students wear glasses(spectacles). If a student in the class is randomly selected, find the   probability that he or she wears glasses(spectacles) by completing the   following activity.

   Activity : There are a total of 30 students in the class.

   $\therefore$ n(S) = $\square$

   Event : A Selected student wears glasses(spectacles)

   $\therefore$ n(A) = $\square$

   $\therefore$ P(A) = $\dfrac{\square}{n(S)}$ ………… Formula

   $$P(A) = \square$$

Q.2 (B) Solve the following sub-questions. (2 marks question)

1) A card is drawn at random from a pack of well shuffled 52 playing cards. Find the probability that the card drawn is a spade.

2) If two coins are tossed, find the probability of event getting head on both the coins.

3) If one die is rolled then find the probability of event that the number on the upper face is greater than 6?

4) If three coins are tossed simultaneously, find the probability of the event to get no head

5) There are 30 cards in a box, each bearing one of the numbers from 1 to 30. One card is drawn at random from the box. Find the probability of event that the card drawn   shows a number which is a multiple of 5.

Q.3 (A) Complete the following activity. (3 marks question)

1) A box contains 5 strawberry chocolates, 6 coffee chocolates and 2 peppermint chocolates. If one of the chocolates is picked from the box at randomly, Find the probability of the following events by completing the activity.
   (i) Event A : it is a coffee chocolate.   (ii) Event B : it is a peppermint chocolate.

   Activity : Let 'S' is the sample space.

   $\therefore$ n(S) = 5+6+2 = 13

   (i) Event A : it is a coffee chocolate

   $\therefore$ n(A) = $\square$

$$\therefore P(A) = \frac{\Box}{n(S)} \qquad \ldots\ldots\ldots\ldots \text{Formula}$$

$$\therefore P(A) = \frac{\Box}{13}$$

Event B : it is a peppermint chocolate.

$$\therefore n(B) = \Box$$

$$\therefore P(B) = \frac{\Box}{n(S)} \qquad \ldots\ldots\ldots\ldots \text{Formula}$$

$$\therefore P(B) = \frac{\Box}{13}$$

## Q.3 (B) Solve the following sub-questions. (3 marks question)

1) If two dice are rolled simultaneously, find the probability of the following events.
   i) Event A : The sum of the digits on the upper faces is at least 10.
   ii) Event B : The sum of the digits on the upper faces is 33.

2) If Three coins are tossed simultaneously, find the probability of the following events.

   i) Event A : To get no heads.
   ii) Event B : To get at least two heads.

3) If One coin and one die are thrown simultaneously, find the probability of the following events.
   i) Event A : To get a tail and an even number.
   ii) Event B: To get head and an odd number.

4) A balloon vendor has 2 red, 3 blue and 4 green balloons. He wants to choose one of them at random to give it to Pranali. What is the probability of the event that Pranali gets,
   (i)   a red balloon
   (ii)   a blue balloon.

Q.4 Solve the following sub-questions. (4 marks question)

1) What is the probability that an ordinary year has 53 Sundays?

2) What is the probability that a leap year has 53 Sundays?

3) A box contains 36 cards, bearing only one number from 1 to 36 on each. If one card is drawn at random, find the probability of an event that the card drawn bears,

   (i) a complete square number.

   (ii) a prime number.
   (iii)a number divisible by 3.

Q.5 Creative questions of 3 marks

1) A bag contains 5 white balls and some blue balls. If the probability of drawing a blue ball is double that of a white ball, determine the number of blue balls in the bag .

2) The faces of a die bear numbers 0, 1, 2, 3, 4, 5. If the die is rolled twice, then find the probability that the product of digits on the upper face is zero.

3) A missing helicopter is reported to have crashed somewhere in the rectangular region shown in the figure .What is the probability that it crashed inside the lake shown in the figure ?
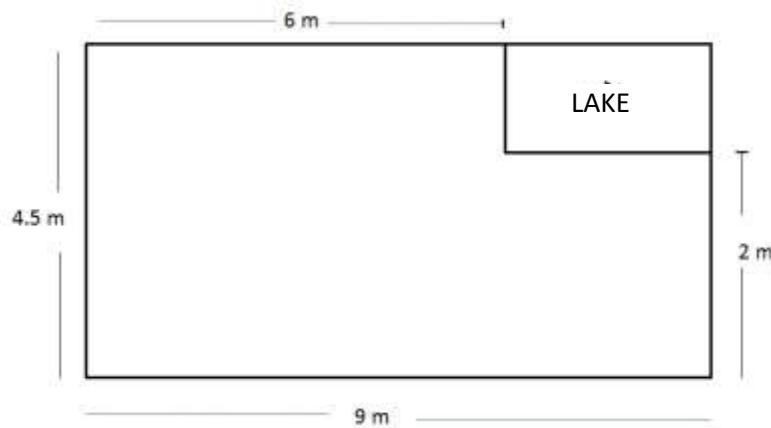
4) Three horses A ,B and C are in a race. A is twice as likely to win as B and B is twice as likely to win as C What is their individual probability of winning?

5) A bag contains 8 red balls and some blue balls. If one ball is drawn randomly the probability of drawing a red ball to a blue ball are in the ratio 5 : 2, determine the probability of drawing a blue ball from the bag.