

STD. X | MATHEMATICS – PART I (ALGEBRA)**Chapter 5: PROBABILITY****Time: 1 Hour****Maximum Marks: 30****Academic Year: 2025–26****GENERAL INSTRUCTIONS:**

- i. All questions are compulsory.
- ii. Use of calculator is not allowed.
- iii. The numbers to the right of the questions indicate full marks.
- iv. In case of MCQs (Q.1A), only the first attempt will be evaluated and will be given credit.
- v. For every MCQ, write the correct alternative (A), (B), (C) or (D) with the subquestion number.
- vi. Draw neat diagrams/write sample space wherever necessary.

Q.1 (A) Choose the correct alternative

- i. A die is thrown. The probability of getting a number greater than 4 is _____. **[1]**
(A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) $\frac{1}{6}$
- ii. Two coins are tossed simultaneously. The probability of getting at most one head is _____. **[1]**
(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) $\frac{3}{4}$ (D) 1
- iii. A bag contains 5 red and 3 blue balls. A ball is drawn at random. The probability that it is a red ball is _____. **[1]**
(A) $\frac{5}{3}$ (B) $\frac{3}{8}$ (C) $\frac{5}{8}$ (D) $\frac{1}{8}$
- iv. In a lucky draw there are 5 prizes and 20 blanks. The probability of NOT getting a prize is _____. **[1]**
(A) $\frac{1}{5}$ (B) $\frac{4}{5}$ (C) $\frac{1}{4}$ (D) $\frac{3}{5}$
- v. Which of the following cannot be the probability of an event? **[1]**
(A) 0.25 (B) $\frac{3}{4}$ (C) -0.5 (D) 0

Q.1 (B) Solve the following subquestions:**[4 Marks – 1 each]**

- i. Write the sample space (S) when a coin and a die are thrown simultaneously. Write $n(S)$. **[1]**
- ii. If $P(A) = 0.72$, find $P(\text{not } A)$. **[1]**
- iii. A card is drawn from a well-shuffled pack of 52 cards. Write the number of outcomes favourable to the event 'card is a king'. **[1]**
- iv. One coin is tossed. Write the sample space S. **[1]**

Q.2 (A) Complete the activities (any 2):**[4 Marks – 2 each]**

- i. A two-digit number is to be formed from the digits 2, 3, 5 without repetition. Complete the following activity to find the probability that the number so formed is an odd number. **[2]**
Let S be the sample space.

$$S = \{ 23, 25, 32, 35, 52, 53 \}$$

$$\therefore n(S) = [?]$$

Let A be the event that the number formed is odd.

$$A = \{ [?] \}$$

$$\therefore n(A) = [?]$$

$$\therefore P(A) = n(A) / n(S) = [?]$$

- ii.** A bag contains 3 red, 4 blue and 5 green balls. One ball is drawn at random. [2]
Complete the following activity to find the probability of drawing a blue ball.

$$\text{Total number of balls} = 3 + 4 + 5 = [?]$$

$$\therefore n(S) = [?]$$

Event B: Ball drawn is blue.

$$n(B) = [?]$$

$$\therefore P(B) = n(B) / n(S) = [?]$$

- iii.** One coin and one die are thrown simultaneously. Complete the following activity to find the probability of getting a tail and a composite number. [2]

Sample space $S = [\quad \text{Write all outcomes} \quad]$

$$n(S) = [?]$$

Event C: Getting a tail and a composite number.

Composite numbers on a die: $\{ [?] \}$

$$n(C) = [?]$$

$$\therefore P(C) = [?]$$

Q.2 (B) Solve the following (any 2): [4 Marks – 2 each]

- i.** A card is drawn from a well-shuffled pack of 52 cards. Find the probability that: [2]
(a) The card drawn is a red card.
(b) The card drawn is a face card.
- ii.** A die is thrown. Find the probability of getting: (a) a prime number, (b) a number less than 3. [2]
- iii.** From a box containing 20 cards numbered 1 to 20, one card is drawn at random. Find the probability that the number on the card is: (a) divisible by 5, (b) an even number. [2]

Q.3 (A) Complete the following activity: [3 Marks]

- i.** A committee of 2 members is to be selected from 3 boys (Ravi, Suresh, Prakash) and 2 girls (Anita, Pooja). Complete the following activity to find the probability that the committee has at least one girl. [3]

List all possible committees (sample space S):

$$S = \{ (Ravi, Suresh), (Ravi, Prakash), (Ravi, Anita), (Ravi, Pooja), (Suresh, Prakash), (Suresh, Anita), (Suresh, Pooja), (Prakash, Anita), (Prakash, Pooja), (Anita, Pooja) \}$$

$$\therefore n(S) = [?]$$

Event A: Committee has at least one girl.

Committees with at least one girl:

$A = \{ \text{ [Write all favourable outcomes] } \}$

$\therefore n(A) = [?]$

$\therefore P(A) = n(A) / n(S) = [?]$

Q.3 (B) Solve the following (any 2):

[6 Marks – 3 each]

- i.** Two dice are thrown simultaneously. Find the probability of the following events: **[3]**
- (a)** Event A: The sum of digits on the upper faces is at least 9.
 - (b)** Event B: The product of digits on the upper faces is 12.
 - (c)** Event C: Getting a doublet (same number on both dice).
- ii.** A box contains 20 cards numbered 1 to 20. A card is drawn at random. Find the probability that the number on the card is: **[3]**
- (a)** A multiple of 3.
 - (b)** A prime number.
 - (c)** Divisible by both 2 and 3.
- iii.** In a class of 40 students, 25 like Mathematics, 17 like Science and 10 like both subjects. If a student is selected at random, find the probability that the student: **[3]**
- (a)** Likes only Mathematics.
 - (b)** Likes only Science.
 - (c)** Likes neither Mathematics nor Science.

Q.4 Solve the following question:

[4 Marks]

- i.** One card is drawn from a well-shuffled pack of 52 cards. Find the probability that the card drawn is: **[4]**
- (a)** An ace.
 - (b)** A red king.
 - (c)** Either a jack, queen or king.
 - (d)** Neither a heart nor a king.

Q.5 Solve the following question:

[5 Marks]

- i.** Two dice are thrown simultaneously. Write the sample space S . Find the probability of the following events: **[5]**
- (a)** Event A: Getting a sum of 7.
 - (b)** Event B: Getting an even number on the first die and an odd number on the second die.
 - (c)** Event C: Getting a sum greater than 10.
 - (d)** Event D: Getting a doublet of odd numbers.
 - (e)** Event E: Getting a sum less than 4.

OR

- ii.** A bag contains some red and some blue balls. The total number of balls is 60. The probability of drawing a red ball is $\frac{2}{3}$. Find: (a) Number of red balls, (b) Number of blue balls, (c) Probability of drawing a blue ball, (d) Probability of NOT drawing a red ball, (e) If 10 more blue balls are added to the bag, what is the new probability of drawing a blue ball? **[5]**

