

Section A

- Write the answer of the following questions. [Each carries 3 Marks] [30]

1. A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. What is the probability that she takes out (i) an orange flavoured candy ? (ii) a lemon flavoured candy ?
2. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red ? (ii) not red ?
3. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green ?
4. Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish (see Figure). What is the probability that the fish taken out is a male fish ?



5. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting
(i) a king of red colour (ii) a face card
(iii) a red face card (iv) the jack of hearts
(v) a spade (vi) the queen of diamonds
6. Five cards — the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.
(i) What is the probability that the card is the queen ?
(ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace ? (b) a queen ?
7. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number, (ii) a perfect square number, (iii) a number divisible by 5.
8. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?
9. A die is thrown twice. What is the probability that
(i) 5 will not come up either time ?
(ii) 5 will come up at least once ?
[Hint : Throwing a die twice and throwing two dice simultaneously are treated as the same experiment.]
10. Which of the following arguments are correct and which are not correct ? Give reasons for your answer.
(i) If two coins are tossed simultaneously there are three possible outcomes – two heads, two tails or

one of each. Therefore, for each of these outcomes, the probability is $\frac{1}{3}$. Is the given argument correct or not correct ? Give reasons for your answer.

- (ii) If a die is thrown, there are two possible outcomes – an odd number or an even number. Therefore, the probability of getting an odd number is $\frac{1}{2}$. Is the given argument correct or not correct ? Give reasons for your answer.



Section A

- Write the answer of the following questions. [Each carries 3 Marks] [30]

1. A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. What is the probability that she takes out (i) an orange flavoured candy ? (ii) a lemon flavoured candy ?

➤ A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. So, it is sure that the candy is of lemon flavoured. But it is impossible that the candy is of orange flavoured.

So, the probability that she takes out an orange flavoured candy is 0 and the probability that she takes out on lemon flavoured candy is 1.

2. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red ? (ii) not red ?

➤ A bag contains 3 red balls and 5 black balls.

Total number of balls in the bag is $3 + 5 = 8$.

(i) **Let Event A : Randomly selected a ball is red.**

∴ There are 3 red balls in a bag.

∴ Number of outcomes favourable to event A = 3

$$\therefore P(A) = \frac{\text{Number of favourable outcomes to event A}}{\text{Total number of outcomes}}$$

$$= \frac{3}{8}$$

(ii) **Let event B : Randomly selected a ball is not red.**

i.e. event B = selected ball is black as the bag contains only two types of balls, red and black There are 5 black ball.

So, the number of outcomes favourable to event B = 5

$$\therefore P(B) = \frac{5}{8} \quad \text{OR}$$

$$\therefore P(B) = 1 - P(A) = 1 - \frac{3}{8} = \frac{5}{8}$$

3. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green ?

➤ A box contains, 5 red marbles

8 white marbles

4 green marbles

—————
Total = 17 marbles

(i) **Event A : Selected marble is of red colour.**

There are 5 red marbles in a box.

So, the number of outcomes favourable to E is 5.

$$\therefore P(A) = \frac{5}{17}$$

(ii) Event B : Selected marble is of white colour

There are 8 white marbles so, the number of outcomes favourable to event B is 8.

$$\therefore P(B) = \frac{8}{17}$$

(iii) Event C : Selected marble is of not green

i.e. selected marble is of red or white colour.

There are 5 red and 8 white marbles in a box.

$\therefore$ The number of outcomes favourable to event C is $5 + 8 = 13$.

$$\therefore P(C) = \frac{13}{17}$$

4. Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish (see Figure). What is the probability that the fish taken out is a male fish ?



➤ Tank contains	5 male fish and
	8 female fish
	Total 13 fish

$\therefore$ The number of all possible outcomes = 13

➤ **Let event A : Fish taken out from the tank is a male fish.**

There are 5 male fish in a tank.

$\therefore$ The number of outcomes favourable to event A is 5.

$$\therefore P(A) = \frac{5}{13}$$

5. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting

- (i) a king of red colour (ii) a face card
(iii) a red face card (iv) the jack of hearts
(v) a spade (vi) the queen of diamonds

➤ One card is drawn from a well shuffled deck of 52 cards so the number of all possible outcomes is 52

(i) Let Event A : Getting a king of red colour.

There are 2 Kings of red colour, heart king and diamond king.

$\therefore$ The number of outcomes favourable to event A is 2.

$$\therefore P(A) = \frac{2}{52} = \frac{1}{26}$$

(ii) Event B : Getting a face cards.

There are 12 facecards (4 kings + 4 Queens + 4 Jacks)

$\therefore$ The number of outcomes favourable to event B is 12.

$$\therefore P(B) = \frac{12}{52} = \frac{3}{13}$$

(iii) Event C : Getting a red face card

There are 6 red face cards.

(2 Kings + 2 Queens + 2 Jacks of Heart and Diamond respectively.)

$\therefore$ The number of outcomes favourable to event C is 6.

$$\therefore P(C) = \frac{6}{52} = \frac{3}{26}$$

(iv) Event D : Getting the jack of hearts

There is only one Jack of heart.

$\therefore$ The number of outcomes favourable to event D is 1.

$$\therefore P(D) = \frac{1}{52}$$

(v) Event E : Getting a spade.

There are 13 spade cards.

$\therefore$ The number of outcomes favourable to event E is 13.

$$\therefore P(E) = \frac{13}{52} = \frac{1}{4}$$

(vi) Event F : Getting a queen of diamonds.

There is only one card of queen of diamond

$\therefore$ The number of outcomes favourable to event F is 1.

$$\therefore P(F) = \frac{1}{52}$$

6. Five cards — the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random.

- (i) What is the probability that the card is the queen ?
- (ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace ? (b) a queen ?

- One card is picked up from five cards the ten, jack, queen, king and ace of diamonds. So the number of all possible outcomes is 5.

(i) Let Event A : Picked up card is queen.

There is only one card of queen.

$\therefore$ The number of outcomes favourable to event A is 1.

$$\therefore P(A) = \frac{1}{5}$$

(ii) **Event B : Second picked up card is an ace.**

If the queen is drawn and put aside then, there are 4 cards remains the ten, jack king and ace of diamonds.

∴ The number of all possible outcomes is 4 and the number of outcomes favourable to event B is 1.

$$P(B) = \frac{1}{4}$$

Event C : Second card picked up is a queen.

If the queen is drawn and put aside, then there are 4 cards remain.

∴ The number of all possible outcomes is 4 and the number of outcomes favourable to event C is 0.

$$\therefore P(C) = \frac{0}{4} = 0$$

7. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number, (ii) a perfect square number, (iii) a number divisible by 5.

► A box contains 90 discs which are numbered from 1 to 90.

∴ The number of all possible outcomes is 90

(i) **Event A : Number on the disc is two digit number.**

Two digits numbers from 1 to 90 are {10, 11, 12, 13 90}.

∴ The number of two digit is $90 - 9 = 81$.

$$\begin{aligned}\therefore P(A) &= \frac{\text{The number of favourable outcomes to event A}}{\text{The number of all possible outcomes}} \\ &= \frac{81}{90} = \frac{9}{10}\end{aligned}$$

(ii) **Event B : Number on the disc is a perfect square number.**

The perfect square number from 1 to 90 are {1, 4, 9, 16, 25, 36, 49, 64, 81}.

∴ There are 9 perfect square number.

$$\begin{aligned}\therefore P(B) &= \frac{\text{The number of favourable outcomes to event B}}{\text{The number of all possible outcomes}} \\ &= \frac{9}{90} = \frac{1}{10}\end{aligned}$$

(iii) **Event C : Number on the disc is divisible by 5**

The number divisible by 5 from 1 to 90 are {5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 75, 80, 85, 90}

∴ There are 18 numbers divisible by 5.

$$\begin{aligned}\therefore P(C) &= \frac{\text{The number of favourable outcomes to event C}}{\text{The number of all possible outcomes}} \\ &= \frac{18}{90} \\ &= \frac{1}{5}\end{aligned}$$

8. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if

it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

- A lot consists of 144 balls pens.

∴ The number of all possible outcomes is 144

- There are 20 defective pens.

∴ There are $144 - 20 = 124$ good pens.

Event A : Nuri will buy a pen.

Nuri will buy a pen if it is good and there are 124 good pens.

$$\begin{aligned}\therefore P(A) &= \frac{\text{The number of favourable outcomes to event A}}{\text{The Total number of outcomes}} \\ &= \frac{124}{144} = \frac{31}{36}\end{aligned}$$

- **Event B : Nuri will not buy a pen.**

Nuri will not buy a pen if a pen is defective and there are 20 defective pens.

$$\begin{aligned}\therefore P(B) &= \frac{\text{The number of favourable outcomes to event B}}{\text{The number of all possible outcomes}} \\ &= \frac{20}{144} \\ \therefore P(B) &= \frac{5}{36}\end{aligned}$$

9. A die is thrown twice. What is the probability that

(i) 5 will not come up either time ?

(ii) 5 will come up at least once ?

[Hint : Throwing a die twice and throwing two dice simultaneously are treated as the same experiment.]

- A die is thrown twice.

The possible outcomes are

(1, 1) (1, 2) (1, 3) (1, 4) (1, 5) (1, 6)

(2, 1) (2, 2) (2, 3) (2, 4) (2, 5) (2, 6)

(3, 1) (3, 2) (3, 3) (3, 4) (3, 5) (3, 6)

(4, 1) (4, 2) (4, 3) (4, 4) (4, 5) (4, 6)

(5, 1) (5, 2) (5, 3) (5, 4) (5, 5) (5, 6)

(6, 1) (6, 2) (6, 3) (6, 4) (6, 5) (6, 6)

The number of all possible outcomes is 36.

- **Event A : 5 will not come up either time.**

The outcomes favourable to event A are

(1, 1), (1, 2), (1, 3), (1, 4), (1, 6)

(2, 1), (2, 2), (2, 3), (2, 4), (2, 6)

(3, 1), (3, 2), (3, 3), (3, 4), (3, 6)

(4, 1), (4, 2), (4, 3), (4, 4), (4, 6)

(6, 1), (6, 2), (6, 3), (6, 6), (6, 6)

∴ The number of outcomes favourable to the event is 25

$$\therefore P(A) = \frac{25}{36}$$

► **Event B : 5 will come up at least once.**

The outcomes favourable to the event B are (1, 5), (2, 5), (3, 5), (4, 5), (6, 5), (5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6)

The number of the outcomes favourable to the event is 11.

$$\therefore P(B) = \frac{11}{36}$$

10. Which of the following arguments are correct and which are not correct ? Give reasons for your answer.

(i) If two coins are tossed simultaneously there are three possible outcomes – two heads, two tails or one of each. Therefore, for each of these outcomes, the probability is $\frac{1}{3}$. Is the given argument correct or not correct ? Give reasons for your answer.

(ii) If a die is thrown, there are two possible outcomes – an odd number or an even number. Therefore, the probability of getting an odd number is $\frac{1}{2}$. Is the given argument correct or not correct ? Give reasons for your answer.

► (i) If two coins are tossed, there are four possible outcomes HH, HT, TH, TT. All the outcomes are not equally likely.

One of each means a head on first and tail on the second or a tail on first and head on second. This makes it twice as likely as two heads or two tails so it is incorrect.

(ii) It is correct. The two outcomes considered in the question are equally likely.