## EXERCISE 7.6

**Q.1 A fair coin is tossed 30 times, the result of which is tabulated below. Study the table and answer the questions given below the table.**

| Events | Tally Marks | Frequency |
|---|---|---|
| Head | 𝍸 𝍸 \|\|\|\| | 14 |
| Tail | 𝍸 𝍸 𝍸 \| | 16 |

**(i) How many time does "head" appear?**

**(ii) How many time does tail appears?**

**(iii) Estimate the probability of the appearance of head?**

**(iv) Estimate the probability of the appearance of tail?**

**Solution:**

Total outcomes = 30

$\Rightarrow$ n (S) = 30

(i) Head appears = 14 times

(ii) Tail appears = 16 times

(iii) Probability of appearance of head = $P(H) = \frac{14}{30} = \frac{7}{15}$

(iv) Probability of appearance of tail = $P(T) = \frac{16}{30} = \frac{8}{15}$

**Q.2 A die is tossed 100 times. The result is tabulated below. Study the table and answer the question given below:**

**Solution:**

| Events | Tally Marks | Frequency |
|---|---|---|
| 1 | 𝍸 𝍸 \|\|\|\| | 14 |
| 2 | 𝍸 𝍸 𝍸 \|\| | 17 |
| 3 | 𝍸 𝍸 𝍸 𝍸 | 20 |
| 4 | 𝍸 𝍸 𝍸 \|\|\| | 18 |
| 5 | 𝍸 𝍸 𝍸 | 15 |
| 6 | 𝍸 𝍸 𝍸 \| | 16 |

**(i) How many times do 3 dots appear?**

**(ii) How many times 5 dots appear?**

**(iii) How many times does an even number of dots appear?**

**(iv) How many times does a prime number of dots appear?**

**(v) Find the probability of each one of the above cases.**

**Solution:**

Total outcomes = 30

$\Rightarrow$ n (S) = 30

From table, we see that

(i) 3 dots appear = 20 times

(ii) 5 dots appear = 15 times

(iii) Even number of dots (2, 4, 6) appear = 17 + 18 + 16 = 51 times

(iv) Prime number of dots (2, 3, 5) appear = 17 + 20 + 15 = 52 times

(v) P (3 dots appear) $= \frac{20}{100} = \frac{1}{5}$

P (5 dots appear) $= \frac{15}{100} = \frac{3}{20}$

P (2, 4, 6) $= \frac{51}{100}$

P (2, 3, 5) $= \frac{52}{100} = \frac{18}{25}$

**Q.3 The eggs supplied by a poultry farm during a week broke during transit as follows:**

$$\mathbf{1\%, 2\%, 1\frac{1}{2}\%, \frac{1}{2}\%, 1\%, 2\%, 1\%}$$

**Find the probability of the eggs that broke in a day. Calculate the number of eggs that will be broken in transiting the following number of eggs:**

**(i) 7,000 (ii) 8,400 (iii) 10,500**

**Solution:**

Eggs that broke in a week $= 1\% + 2\% + 1\frac{1}{2}\% + \frac{1}{2}\% + 1\% + 2\% + 1\% = 9\%$

Eggs that broke in a day $= \frac{9}{7}\%$

(i) Number of eggs that will be broken out of 7000 $= 7000 \times \frac{9}{7}\%$

$= 7000 \times \frac{9}{7} \times \frac{1}{100} = 90$

(ii) Number of eggs that will be broken out of 8400 $= 8400 \times \frac{9}{7}\%$

$= 8400 \times \frac{9}{7} \times \frac{1}{100} = 108$

(iii) Number of eggs that will be broken out of 10500 $= 10500 \times \frac{9}{7}\%$

$= 10500 \times \frac{9}{7} \times \frac{1}{100} = 135$

**MUTUALLY EXCLUSIVE EVENTS**

If a sample space $S = \{1, 3, 5, 7, 9\}$ and an event $A = \{1, 3, 5\}$ and another event $B = \{9\}$, then A and B are disjoint sets and they are said to be mutually exclusive events.

**EQUALLY LIKELY EVENTS**

If two events A and B occur in an experiment then A and B are said to be equally likely events if each one of them has equal number of chances of occurrence.

**ADDITION OF PROBABILITIES**

If A and B are two events, then the formulas for the addition of probabilities are:

(i) $P(A \cup B) = P(A) + P(B)$, when A and B are disjoint.

(ii) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ when A and B are overlapping or $B \subseteq A$.

## EXERCISE 7.7

**Q.1 If sample spaces = {1, 2, 3, .... 9}, Event A = {2, 4, 6, 8} and Event B = {1, 3, 5} find P (A∪B)**

**Solution:**

Here $S = \{1, 2, 3, \ldots\ldots 9\} \Rightarrow n(S) = 9$

$A = \{2, 4, 6, 8\} \Rightarrow n(A) = 4$

$P(A) = \frac{n(A)}{n(S)} = \frac{4}{9}$

Also $B = \{1, 3, 5\} \Rightarrow n(B) = 3$

$\Rightarrow P(B) = \frac{n(B)}{n(S)} = \frac{3}{9} = \frac{1}{3}$

As A and B are disjoint or mutually exclusive events. So

$P(A \cup B) = P(A) + P(B)$

$= \frac{4}{9} + \frac{1}{3} = \frac{4+3}{9} = \frac{7}{9}$