

Day - 06

① $3! = 3! \text{ times } 2! \text{ times } 1$

$= 6$

Therefore, there are 6 ways to seat 3 students in a row.

② You can choose 1 ball out of 5
 $= 5 \text{ ways}$

③ $= 3!$

$= 3 \times 2 \times 1$

$= \underline{6 \text{ ways}}$

④ Choose 2 from 4.

$= {}^4C_2$

$= \underline{6 \text{ ways}}$

⑤ Total outcomes = 2 (Head, tail)

Favourable = 1

$= \underline{\underline{\frac{1}{2}}}$

⑥ Total outcomes = 6

Favourable = 1

$= \underline{\underline{\frac{1}{6}}}$

⑦ Tens place: 2 choices,

Unit place = 2 remaining

$= 3 \times 2 = 6 \text{ numbers}$

⑧ 3 apples

4 oranges

Total = 7

$= \underline{\underline{\frac{3}{7}}}$

⑨ $4!$

$= 4 \times 3 \times 2 \times 1$

$= \underline{24 \text{ ways}}$

⑩ Total = 5

Green = 2

$= \underline{\underline{\frac{2}{5}}}$

$$\begin{aligned} \textcircled{11} & \text{ 4 choices, second: 3, third: 2} \\ & = 4 \times 3 \times 2 \\ & = \underline{24} \end{aligned}$$

$$\begin{aligned} \textcircled{12} & \text{ Ways to choose 3 from 7 people} \\ & = {}^7C_3 \\ & = \underline{35 \text{ ways}} \end{aligned}$$

$$\begin{aligned} \textcircled{13} & \text{ Kings} = 4 \\ & = 4/52 \\ & = \underline{1/13} \end{aligned}$$

$$\begin{aligned} \textcircled{14} & \text{ 5!} \\ & = 5 \times 4 \times 3 \times 2 \times 1 \\ & = \underline{120 \text{ ways}} \end{aligned}$$

$$\begin{aligned} \textcircled{15} & \text{ Total} = 4 \\ & \text{Black} = 4 \\ & = 4/10 \\ & = \underline{2/5} \end{aligned}$$

$$\begin{aligned} \textcircled{16} & \text{ Order matters} = \\ & {}_4P_3 \\ & = 4 \times 3 \times 2 \\ & = \underline{24} \end{aligned}$$

$$\begin{aligned} \textcircled{17} & \text{ Even numbers} = 2, 4, 6 \\ & \rightarrow 3 \text{ outcomes} \\ & = 3/6 \\ & = \underline{1/2} \end{aligned}$$

$$\begin{aligned} \textcircled{18} & \text{ All 4 letters are different} \\ & = {}_4C_2 \\ & = \underline{6 \text{ ways}} \end{aligned}$$

$$\begin{aligned} \textcircled{19} & \text{ 13 hearts out of 52} \\ & = 13/52 \\ & = \underline{1/4} \end{aligned}$$

$$\begin{aligned} \textcircled{20} & \text{ Circular permutation: } (n-1)! \\ & = 3! \\ & = 3 \times 2 \times 1 = \underline{6 \text{ ways}} \end{aligned}$$

(20) Case 1 (ends in 2)

: Remaining : 1, 3, 4, 5 \rightarrow
 $3! = 6$

Case 2 (ends in 4)

: Remaining : 1, 2, 3, 5
 $= 3! = 6$

Total = $6 + 6 = 12$

(22) Total balls = 12

ways to choose 2 green
 $= {}^5C_2$

$$= 5 \times 2$$

$$= 10$$

Total ways = ${}^{12}C_2$
 $= 66$

$$= 10/66$$

$$= \underline{\underline{5/33}}$$

(23) Total ways without restriction.

$$= 5! = \underline{\underline{120}}$$

Treat 2 as one unit

$$= 4! \times 2!$$

$$= 48 \text{ (sitting together)}$$

Not together = $120 - 48$

$$= \underline{\underline{72 \text{ ways}}}$$

(24) 2 women, 2 men

$$= {}^8C_2 \times {}^{10}C_2$$

$$= 28 \times 45$$

$$= \underline{\underline{1260}}$$

3 women, 1 man.

$$= {}^8C_3 \times {}^{10}C_1$$

$$= 56 \times 10$$

$$= \underline{\underline{560}}$$

4 women = ${}^8C_4 = 70$

Total = $1260 + 560 + 70$

$$= \underline{\underline{1890 \text{ ways}}}$$

Q25) Total outcomes = $6 \times 6 = 36$.

Pairs: $(1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1)$.

= 6 outcomes.

$$= \frac{6}{36}$$

$$= \frac{1}{6}$$

$$\underline{\underline{\frac{1}{6}}}$$