

1.

①

$${}^6C_2 = 15$$

②

 ${}^7C_3$ 

$$\frac{7 \times 6 \times 5}{3 \times 2} = 35$$

4 Vowel, 10 Consonant

2.

$$\frac{{}^3C_1 \cdot 2!}{}$$



$${}^{10}C_3 \cdot {}^4C_2 \times 2 \times 4!$$

or

$$4 \times {}^3C_1 \cdot {}^{10}C_3 \cdot 4!$$

3.

$$7! - 6! \times 2!$$

$$\boxed{BG} \vee \underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad} \underline{\quad} R, \quad GB \vee 1 \vee 0 R.$$

Gap Method  $\rightarrow$

$$\begin{array}{c} \downarrow \\ X - X - X - X - X \\ \downarrow \\ 5! \cdot {}^6C_2 \quad \text{or} \quad 5! \cdot {}^6P_2 \end{array}$$

4. Find no. of ways to arrange 'n' persons in 'r' seats ( $r < n$ ) so that

(i) 's' particular persons are always present ( $s < r$ )

(ii) 's' particular persons are always present ( $s < r$ ) together

(iii) 's' particular persons are always present ( $s < r$ ) together in a definite order.

$$(i) \quad {}^{n-s}C_{r-s} r! \quad \text{or} \quad {}^{n-s}P_{r-s}$$

$$(ii) \quad {}^{n-s}C_{r-s} (r-s+1) s!$$

Diagram illustrating the arrangement of persons:

The diagram shows two rows of person labels:  $p_1, p_2, \dots, p_s, p_{s+1}, \dots, p_r$  in the top row and  $p_1, p_2, \dots, p_s, p_{s+1}, \dots, p_r$  in the bottom row. A box encloses the first  $s$  persons in both rows. A bracket under the bottom row's last  $r-s+1$  persons is labeled  $r-s+1$ .



5.

(i)

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$   
 $X \underline{B} X \underline{B} X \underline{B} X \underline{B} X$

$4! \cdot {}^5C_4 \cdot 4!$

(ii)

$8! - 5!4!$

$\begin{matrix} B & \bar{G} & B & \bar{G} & B & \bar{G} & B & \bar{G} \\ G & B & G & B & G & B & G & B \end{matrix} \rightarrow$

$4!4!$

(iii)

$2 \times 4! \times 4!$

$\begin{matrix} \downarrow & \downarrow \\ G_1 & G_1 \end{matrix}$

$B_1 G_1$

(iv)

$2 \times 4! \times 4! -$

$2 \times 3! \times 3! \times {}^7C_1$

$\times \begin{matrix} \downarrow \\ B_1 G_1 \end{matrix} \begin{matrix} B_2 & G_2 & B_3 & G_3 & B_4 & G_4 & B_5 & G_5 \\ 2 & 3 & 4 & 4 & 3 & 2 & 2 & 2 \end{matrix} \times$

(v)

$4! \cdot (2!)^4$

21-30 (Text)

SC-(1-20)