



### Permutations Ex 16.5 Q1(i)

There are 12 letters in the word 'INDEPENDENCE' out of which 2 are D'S, 3 are N'S, 4 are E'S and the rest are all distinct.

$$\begin{aligned}
 \text{so, the total number of words} &= \frac{12!}{2! 3! 4!} \\
 &= \frac{12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4!}{2! 3! 4!} \\
 &= \frac{12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5}{2 \times 3 \times 2} \\
 &= 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \\
 &= 1663200.
 \end{aligned}$$

### Permutations Ex 16.5 Q1(ii)

There are 12 letters in the word 'INTERMEDIATE' out of which 2 are I'S, 2 are T'S, 3 are E'S and the rest are all distinct.

$$\begin{aligned}
 \text{so, the total number of words} &= \frac{12!}{2! 2! 3!} \\
 &= \frac{12 \times 11 \times 10 \times 9 \times 8 \times 6 \times 5 \times 4 \times 3 \times 2!}{2! 2! 3!} \\
 &= \frac{12 \times 11 \times 10 \times 9 \times 8 \times 6 \times 5 \times 4 \times 3}{2 \times 3 \times 2} \\
 &= 11 \times 10 \times 9 \times 8 \times 6 \times 5 \times 4 \times 3 \\
 &= 19958400
 \end{aligned}$$

### Permutations Ex 16.5 Q1(iii)

There are 7 letters in the word 'ARRANGE' out of which 2 are A'S, 2 are R'S, and the rest are all distinct.

$$\begin{aligned}
 \text{So, the total number of words} &= \frac{7!}{2! 2!} \\
 &= \frac{7 \times 6 \times 5 \times 4 \times 3 \times 2!}{2! 2!} \\
 &= \frac{7 \times 6 \times 5 \times 4 \times 3}{2 \times 1} \\
 &= 7 \times 6 \times 5 \times 2 \times 3 \\
 &= 1260
 \end{aligned}$$

### Permutations Ex 16.5 Q1(iv)

There are 5 letters in the word 'INDIA' out of which 2 are I'S, and the rest are all distinct.

$$\begin{aligned}
 \text{so, the total number of} & \\
 \text{words} &= \frac{5!}{2!} \\
 &= \frac{5 \times 4 \times 3 \times 2!}{2!} \\
 &= 60
 \end{aligned}$$

\*\*\*\*\* END \*\*\*\*\*