



Permutations Ex 16.4 Q5

There are 6 letters in the word 'SUNDAY'. The total number of words formed with these 6 letters is the number of arrangements of 6 items, taken all at a time, which is equal to ${}^6P_6 = 6!$
 $= 6 \times 5 \times 4 \times 3 \times 2 \times 1$
 $= 720.$

If we fix up N in the beginning, then the remaining 5 letters can be arranged in ${}^5P_5 = 5!$ ways
 so, the total number of words which begin with N = 5!
 $= 5 \times 4 \times 3 \times 2 \times 1$
 $= 120$

if we fix up N in the beginning and Y at the end, then the remaining 4 letters can be arranged in ${}^4P_4 = 4!$ ways.

So, the total number of words which begin with N and end with Y = $4! = 4 \times 3 \times 2 \times 1 = 24.$

Permutations Ex 16.4 Q6

There are 10 letters in the word 'GANESHPURI'. The total number of words formed is equal to ${}^{10}P_{10} = 10!$

(i) If we fix up G in the beginning, then the remaining 9 letters can be arranged in ${}^9P_9 = 9!$ ways

(ii) If we fix up P in the beginning and I at the end, beginning 8 letters can be arranged in ${}^8P_8 = 8!$.

(iii) There are 4 vowels and 6 consonants in the word 'GANESHPURI'.

Considering 4 vowels as one letter,

We have 7 letters which can be arranged in ${}^7P_7 = 7!$ ways.

A, E, U, I can be put together in $4!$ ways.

Hence, required number of words = $7! \times 4!$.

(iv) We have to arrange 10 letters in a row such that vowels occupy even places. There are 5 even places {2, 4, 6, 8, 10}. 4 vowels can be arranged in these 5 even places in 5P_4 ways.

Remaining 5 odd places {1, 3, 5, 7, 9} are to be occupied by the 6 consonants.

This can be done in 6C_5 ways.

Hence, the total number of words in which vowels occupy even places = ${}^5P_4 \times {}^6P_5$

$$= \frac{5!}{(5-4)!} \times \frac{6!}{(6-1)!}$$

$$= 5! \times 6!$$

Permutations Ex 16.4 Q7

(i) There are 6 letters in the word 'VOWELS'. The total number of words formed with these 6 letters is the number of arrangements of 6 items, taken all at a time, which is equal to

$${}^6P_6 = 6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$$

(ii) If we fix up E in the beginning then the remaining 5 letters can be arranged in ${}^5P_5 = 5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$ ways

(iii) If we fix up O in the beginning and L at the end, the remaining 4 letters can be arranged in ${}^4P_4 = 4! = 4 \times 3 \times 2 \times 1 = 24.$

(iv) There are 2 vowels and 4 consonants in the word 'VOWELS'.

Considering 2 vowels as one letter, we have 5 letters which can be arranged in

$${}^5P_5 = 5! \text{ ways.}$$

O, E can be put together in $2!$ ways.

Hence, required number of

$$\text{words} = 5! \times 2!$$

$$= 5 \times 4 \times 3 \times 2 \times 1 \times 2 \times 1$$

$$= 120 \times 2$$

$$= 240$$

(v) There are 2 vowels and 4 consonants in the word 'VOWELS'.

Considering 4 consonants as one letter, we have 3 letters which can be arranged in ${}^3P_3 = 3!$ ways.

U, W, L, S can be put together in $4!$ ways.

$$\text{Hence, required number of words in which all consonants come together} = 3! \times 4!$$

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

$$= 144.$$

Permutations Ex 16.4 Q8

We have to arrange 7 letters in a row such that vowels occupy even places.

There are 3 even places $\{2,4,6\}$. Three vowels can be arranged in these 3 even places in $3!$ ways.

Remaining 4 odd places $\{1,3,5,7\}$ are to be occupied by the 4 consonants. This can be done in $4!$ ways.

Hence, the total number of words in which vowels occupy even places = $3! \times 4!$
 $= 3 \times 2 \times 4 \times 3 \times 2 = 144$

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