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 begining, then the remaining 5 letters can be arranged in $^5P_5 = 5!$ ways

so, the total number of words which begin which $N = 5!$

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

$= 120$

if we fix up N in the begining 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 begining, then the remaining 9 letters can be arranged in $^9P_9 = 9!$ ways

(ii) If we fix up P in the begining and I at the end, begining 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 begining 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 begining 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 letters which can be arranged in
$^5P_5 = 5!$ ways.
O, E can be put together in 2! ways.

Hence, required number of
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.

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

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

$= 144.$

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 = $3! \times 4!$
$= 3 \times 2 \times 4 \times 3 \times 2 = 144$

*********** END **********