CH #7 (Ist Year)

TAHIR

Exercise: 7.3

Q.1 Imp How many arrangements of letters of words can be made:

(i) Pakpattan

No. of letters = 9

P is repeated 2 times

A is repeated 3 times

T is repeated 2 times

Others are 1 times

$$\text{Permutation} = \frac{9!}{3!\,2!\,2!\,1!}$$

$$= \frac{9\times8\times7\times6\times5\times4\times3\times2\times1}{(3\times2\times1)\times(2\times1)\,(2\times1)\,1}$$

$$= 15120 \text{ Ans.}$$

(ii) Pakistan

No. of letters = 8

A is repeated 2 times

others are once

$$\text{Permutation} = \frac{8!}{2!\,1!}$$

$$= \frac{8\cdot7\cdot6\cdot5\cdot4\cdot3\cdot2!}{2!}$$

$$= 8\cdot7\cdot6\cdot5\cdot4\cdot3$$

$$= 20160 \text{ Ans.}$$

(iii) MATHEMATICS

No. of letters = 11

M is 2 times

A is 2 times

T is 2 times

Others are once

$$\text{Permutation} = \frac{11!}{2!\,2!\,2!}$$

$$= \frac{11\cdot10\cdot9\cdot8\cdot7\cdot6\cdot5\cdot4\cdot3\cdot2!}{2\cdot2\cdot2!}$$

$$= 4989600 \text{ Ans.}$$

(iv) ASSASSINATION

No. of letters = 13

A is 3 times.

S is 4 times.

N is 2 times.

I is 2 times

others are once.

$$\text{Permutation} = \frac{13!}{3!\,4!\,2!\,2!}$$

$$= \frac{13\cdot12\cdot11\cdot10\cdot9\cdot8\cdot7\cdot6\cdot5\cdot4!}{3\cdot2\cdot1\cdot2\cdot1\cdot2\cdot1\cdot4!}$$

$$= 10810800 \text{ Ans}$$

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Q.2 How many arrangements can be made by PANAMA if every arrangement begins with P?

The arrangements fixing at the beginning:

If P is fixed then 5 letters are left

A repeats 3 times and others are once.

Permutation Containing every word with P = $\frac{5!}{3!\,1!}$

$= \frac{5.4.3!}{3!} = 5.4 = 20$ Ans.

Q.3 The words form with ATTACKED fixing C and K

By fixing C and K 6 letters are left out of 8 letters.

Required Permutation = $\frac{6!}{2!\,2!\,1!}$

where T repeats twice and A repeats twice.

$= \frac{6.5.4.3.2!}{2.1.2!} = 180$ Ans.

Q.4 The numbers greater than 1000,000 using 0,2,2,2,3,4,4

The 0 can not come at the first place to form nos. > 1000,000

2 is repeated 3 times

4 is repeated 2 times and others are once

(i) $2000,000 = \frac{6!}{2!\,2!} = \frac{6.5.4.3.2!}{2.1.2!} = 180$

(ii) $3000,000 = \frac{6!}{3!\,2!} = \frac{6.5.4.3!}{3!\,2.1} = 6.5.2 = 60$

(iii) $4000,000 = \frac{6!}{3!.1!} = \frac{6.5.4.3!}{3!} = 120$

Total numbers greater than 1000, 000 = 180 + 60 + 120 = 360 Ans.

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Q.5 To form 6-digit numbers using 2,2,3,3,4,4 :

Total number of 6digit numbers $= \frac{6!}{2!2!2!} = \frac{6.5.4.3.2!}{2.1.2.1.2!}$

$= 90$ Ans.

The numbers will be between 400,000 and 430,000 if 4,2 are at extreme left position so numbers.

The numbers b/w 430,000 and 400,000 $= \frac{4!}{2!\,1!} = \frac{4.3.2!}{2!}$

$= 12$ Ans.

Q.6 To find number of Commitees using 3,4,2,2 :

Total members $= 11$

The number of Commitees $= \frac{11!}{3!4!2!2!}$

$= \frac{11.10.9.8.7.6.5.4!}{3.2.1.2.1.2.1.4!} = 69300$ Ans.

Combination :-

"The arrangement of objects without considering order is called Combination."

If n are total objects and r are the taken objects then Combination is defined as

$$^nC_r = \frac{^nP_r}{r!} = \frac{n!}{(n-r)!\,r!}$$

The important results:

* $^nC_n = \frac{n!}{(n-n)!\,n!} = 1$
* $^nC_0 = \frac{n!}{0!\,n!} = 1$
* $^nC_r = {}^nC_{n-r}$ (Complementry Combination)

* Permutation, Combination does not exist if $r > n$ and if "n" or "r" are -ve integers.
* Factorial of -ve integer does not exist.