

TAHIR

Exercise: 7.3

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شاہ پور کھیاں
TAHIR MAHMOOD

(9)

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

$$\begin{aligned} \text{Permutation} &= \frac{9!}{3! \cdot 2! \cdot 2! \cdot 1!} \\ &= \frac{9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1}{(3 \times 2 \times 1) \times (2 \times 1) \times (2 \times 1) \times 1} \\ &= 15120 \text{ Ans.} \end{aligned}$$

(ii) Pakistan

No. of letters = 8

A is repeated 2 times

Others are once

$$\begin{aligned} \text{Permutation} &= \frac{8!}{2! \cdot 1!} \\ &= \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 1} \\ &= 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \\ &= 20160 \text{ Ans.} \end{aligned}$$

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(iii) MATHEMATICS

No. of letters = 11

M is 2 times

A is 2 times

T is 2 times

Others are once

$$\begin{aligned} \text{Permutation} &= \frac{11!}{2! \cdot 2! \cdot 2!} \\ &= \frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 2 \cdot 2} \\ &= 4989600 \text{ Ans.} \end{aligned}$$

(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

$$\begin{aligned} \text{Permutation} &= \frac{13!}{3! \cdot 4! \cdot 2! \cdot 2!} \\ &= \frac{13 \cdot 12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1 \cdot 2 \cdot 1 \cdot 2 \cdot 1 \cdot 2 \cdot 1} \\ &= 10810800 \text{ Ans.} \end{aligned}$$

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Q2 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.

$$\text{Permutation containing every word with P} = \frac{5!}{3!1!1!}$$

$$= \frac{5 \cdot 4 \cdot 3!}{3!} = 5 \cdot 4 = 20 \text{ Ans.}$$

Q3 The words form with ATTACKED fixing C and K

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

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

where T repeats twice and A repeats twice.

$$= \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2!}{2! \cdot 2!} = 180 \text{ Ans.}$$

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Q4 The numbers greater than 1000,000 using 0,2,2,2,3,4,4.

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

2 is repeated 3 times

4 is repeated 2 times and others are once

$$(i) 2000,000 = \frac{6!}{2!2!} = \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2!}{2! \cdot 2!} = 180$$

$$(ii) 3000,000 = \frac{6!}{3!2!} = \frac{6 \cdot 5 \cdot 4 \cdot 3!}{3! \cdot 2!} = 6 \cdot 5 \cdot 2 = 60$$

$$(iii) 4000,000 = \frac{6!}{3!1!} = \frac{6 \cdot 5 \cdot 4 \cdot 3!}{3!} = 120$$

$$\text{Total numbers greater than 1000,000} = 180 + 60 + 120 = 360 \text{ Ans.}$$

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CH #7 (1st Year)

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

$$\text{Total number of 6 digit numbers} = \frac{6!}{2!2!2!} = \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2!}{2 \cdot 1 \cdot 2 \cdot 1 \cdot 2!} = 90 \text{ Ans.}$$

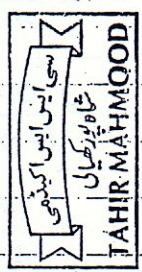
The numbers will be between 400,000 and 430,000 if 4,2 are at extreme left position so numbers.

$$\text{The numbers b/w 430,000 and 400,000} = \frac{4!}{2!1!} = \frac{4 \cdot 3 \cdot 2!}{2!} = 12 \text{ Ans.}$$

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

Total members = 11

$$\text{The number of Committees} = \frac{11!}{3!4!2!2!} = \frac{11 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4!}{3 \cdot 2 \cdot 1 \cdot 2 \cdot 1 \cdot 4!} = 69300 \text{ Ans.}$$



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

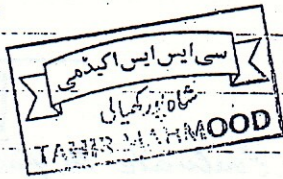
$${}^n C_r = \frac{{}^n P_r}{r!} = \frac{n!}{(n-r)! r!}$$

The important results:

* ${}^n C_n = \frac{n!}{(n-n)! n!} = 1$

* ${}^n C_0 = \frac{n!}{0! n!} = 1$

* ${}^n C_r = {}^n C_{n-r}$
(Complementary Combination)



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