Nishant Jindal

Q Find Exponent of 18 in $\lfloor 100$

$18 \downarrow (2\times3^2)$

$\lfloor 100 = 2^{97}\times(3^2)^{24}\times5^{24}\times7^{14}\times\cdots$

$= 2^{24}\times(3^2)^{24}\times2^{73}$

$= (2\times3^2)^{24}\times$ ——

$= (18)^{24}\times$ ——

Exponent of 18 in 24

Q Exponent of 18 in ${}^{100}C_{50}$?

${}^{100}C_{50} = \frac{\lfloor 100}{\lfloor 50 \lfloor 100-50} = \frac{\lfloor 100}{\lfloor 50 \lfloor 50} = \frac{(18)^{24}\times\cdots}{(18)^{11}\times\cdots}$

Exp. of 18 in $\lfloor 100$ = 24

Exp. in ${}^{100}C_{50}$ = 2

Exp of 18 in $\lfloor 50$

$E_2 \lfloor 50 = \left[\frac{50}{2}\right]+\left[\frac{50}{4}\right]+\left[\frac{50}{8}\right]+\left[\frac{50}{16}\right]+\left[\frac{50}{32}\right]$

$E_3 \lfloor 50 = 25+12+6+3+1 = 47$

$= \left[\frac{50}{3}\right]+\left[\frac{50}{9}\right]+\left[\frac{50}{27}\right]$

$= 16+5+1 = 22$

$E_{18} \lfloor 115 = 2^{22}\times3^{22}\times2^{25}+\cdots$ ——,

$= (2\times3^2)^{11}$

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Combination = Selection

1) It is simply Selection

Permutation = Arrangement

1) It is 2 Way Process. (less Use)
   1st Select then Arrange

2) If Qs asks to select r distinct object out of n distinct objects?

$$\text{No. of ways} = {}^{n}C_{r} = \binom{n}{r} = {}^{n}_{r}C$$

3) If Qs asks to arrange r objects out of n distinct objects.
   so then $\text{No of N} = {}^{n}P_{r} = {}^{n}C_{r} \times \lfloor r$

Q There are 10 Persons in a Room. Each Person Shakes hand with every Person. find total No of handshakes.

For handshake we need 2 persons.

So No of handshakes = No of selection of 2 Persons out of n Person

$$= {}^{10}C_{2} = \frac{10 \times 9}{2 \times 1} = 45$$

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Q Eight teams to Participate in a Cricket tournament

If each team plays once against each of others find total No of matches?

1 match के लिए (OR) we need 2 teams

⇒ No of Matches = No of selection of 2 teams out of 8.

$= {}^8C_2 = \frac{8 \times 7}{2} = 28.$

Q Find No of ways of Selecting 3 B & 4 G. from 5 B & 6 G.?

No of ways $= {}^5C_3 \times {}^6C_4$

Master Problem

See Word GANESHPURI

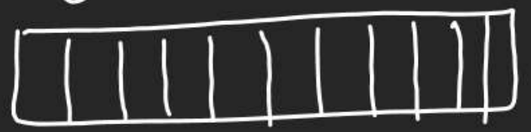
(1) HM 3 letter word can be formed.

$= {}^{10}C_3 = \frac{10 \cdot 9 \cdot 8}{3 \cdot 2 \cdot 1} = 120$

(2) HM 4 letter word can be formed

${}^{10}C_4$

(3) HM Words can be formed Using all the letters.



$= \underline{10} = 10!$

(4) HM Words can be formed Using letter G at 1st Place

1 G ⇐ 9 Places & 9 letters →

⇒ No of Word $= 1 \times \underline{9}$

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(5) How Words can be formed using all letters ... that begins with Consonants.

G N S H P R

$^6C_1 \times 9!$

4 Vowels

(6) ... Begin with Consonants & end with consonant.

$^6C_1 \times {}^5C_1 \times 8!$

1st Last

(7) Begin with Consonant & end with vowel

$^6C_1 \times {}^4C_1 \times 8!$

1st Last

(8) ... When all vowels are together?

G N S H A E U I P R

$\lfloor 7 \times \lfloor 4$

(9) ... When all consonants are together.

A E G N S H R P U I

$\lfloor 5 \times \lfloor 6$

(10) ... When all Consonants together & all vowel together.

G N S H P R A E U I

$\Rightarrow \lfloor 2 \times \lfloor 6 \times \lfloor 4$

(11) When No 2 Vowels are together.

Gap Method $\times$ G A N E S H I P R

$\lfloor 6 \times {}^7C_4 \times \lfloor 4$

(12) When G, A, N are always seperated.

G A P

$\times E \times S \times H \times P \times U \times R \times I \times$

$\lfloor 7 \times {}^8C_3 \times \lfloor 3$

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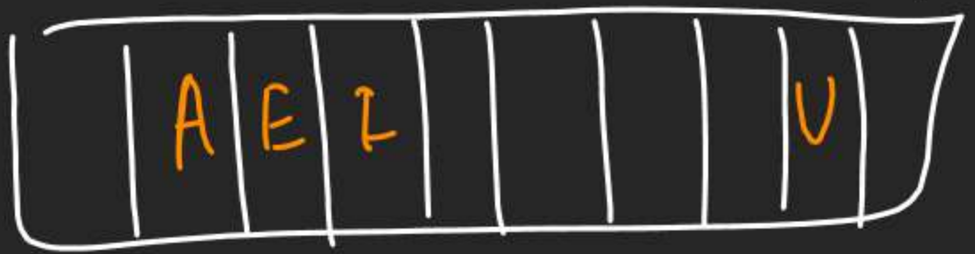
(13) Vowel occurs in Alphabatical order.

A E I U
$\longrightarrow$

इस order में चाहिये } change not Allowed
1 ही तरीके से आये



$^{10}C_4 \times 1 \times \underline{|6}$

(14) Consonant occur in Albhabatical order.

G H N P R S
$\longrightarrow$

$^{10}C_6 \times 1 \times \underline{|4}$

↑ 4 vowels को 4 Places पर रखने के Ways.

(15) When all Alphabets are in Alphabatical Order.

$= 1$

Learning from Above Qs.

1) Place with Condition of Qs should be filled 1^{st}

2) NOW to fill n places by n objects $= n!$

(3) When some things are always together use String Method

(4) Gap Method —— Seperated Use

Q NOW in which 4 person can Sit in 6 Chairs?

$= {}^{6}C_4 \times \underline{|4}$

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String & Gap Method

Q No of ways if different colors of a Rainbow are arranged so that blue & green are never together.

String Method

V I B G Y O R

(M1) B, G को Bandh दो → BG

Baki logo Ko Khda Kar, Bora Khi Bhi Rkh do

V I Y BG O R = $\lfloor 6 \times \lfloor 2$

No of ways when B, G are Never together

$= \lfloor 7 - \lfloor 6 \times \lfloor 2 \Rightarrow 7 \times \lfloor 6 - \lfloor 6 \times 2$

$\Rightarrow \lfloor 6 (7-2) = 5 \times 720$ ✱

↑ Total − (ways when B, G are always together)

(M2) Gap Method → 1) B, G Nikaal Lo

2) Rest Ko Arrange

× V B I × Y × O × R × G.

$\lfloor 5 \times {}^{6}C_{2} \times \lfloor 2$ → first 5 की Arr. then 6 gap Bne → 6 gap में 2 gap chune 2 gap में 2 Bnde

$120 \times 2 \times 15 = 240 \times 15$ (विधि)

Sath Rakhna ho String Method

Dur Karna ho GAP method.

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Q IHMIW a football Series of 5 matches Can be forecasted?

match → 3 Forecast. W L D

$3C_1 \times 3C_1 \times 3C_1 \times 3C_1 \times 3C_1$

$= 3^5$

Q When 6 men & 4 women makes a committee of 6 members find No of ways that it was formed with atmost 2 ladies.

6 M & 4 W

$NOW = {}^6C_6 \times {}^4C_0 + {}^6C_5 \times {}^4C_1 + {}^6C_4 \times {}^4C_2$

Q Student has to solve 6 Qs out of 10 Qs.

If paper was divided into 2 parts, 5 Qs each & No student is allowed to do more than 4 Qs from 1 set

find NOW.

10 Qs → 6 Qs solve.

Set 1 5Q	Set 2 5Qs.
4Q.	2Q
3Q	3Q
2Q	4Q

${}^5C_4 \times {}^5C_2 + {}^5C_3 \times {}^5C_3 + {}^5C_2 \times {}^5C_4$