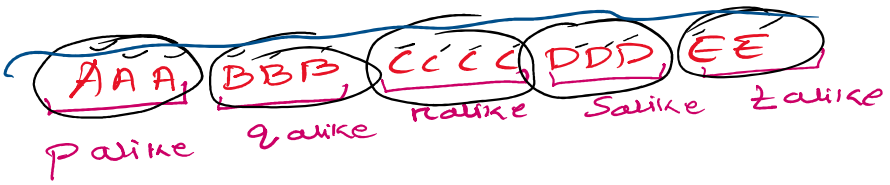
Lot Type	No. of Arrangement (Permutation)	No. of Selection (Combination)
'n' diff. Items Taken all at a time	$n!$	1
'n' diff. Items Taken 'r' at a time.	${}^{n}P_{r} = \frac{\lfloor n}{\lfloor n-r}$	$\frac{\lfloor n}{\lfloor n-r \lfloor r} = {}^{n}C_{r}$
'n' diff. Items $p$alike, $q$alike, $r$alike. Taken all at a time.	$\frac{n!}{p!\,q!\,r!}$	1
'n' diff. Items $p$alike, $q$alike, $r$alike, Taken 'R' at a time	? Selection × ordering	Selection, ordering

Case - 01 : 'n' different Items $p$alike, $q$alike, $r$alike.

LETTER =

No. of arrangement. $= \frac{6!}{2!\,2!}$



No. of arrangement $= \frac{15!}{3!\,3!\,4!\,3!\,2!}$ ($n = 15$)

'n' diff. Items $p$alike, $q$alike, $r$alike.

Total No. of ways $= \frac{n!}{p!\,q!\,r!}$

Total No. of ways = $\frac{n!}{p!\,q!\,r!}$

Q) How many four-letter words can be formed using the letters of the word "INEFFECTIVE"?

(A) 840 (B) 1380 (C) 1422 (D) None of these.

INEFFECTIVE

EEE II FF N C T V

Case 01 4 alike = 0

Case 02 3 alike 1 diff. =

EE II

II EE

II FF

EE FF

EE I, F, N, C, T, V

1 selected 1

$= {}^{1}C_1 \times {}^{6}C_1 \times \frac{4!}{3!} = 24$

Case 03 2 alike 2 alike

1 group 1 group

$= {}^{3}C_2 \times \frac{4!}{2!\,2!} = 18$

Case 04 2 alike 2 diff

EE E

II

FF

1 group 6 ----

$= {}^{3}C_1 \times {}^{6}C_1 \times \frac{4!}{2!} = 540$

Case 05 all different:

E, F, I, N, C, T, V

$^7C_4 \times 4! = 840$

No. of arrangement = Selection × ordering

Total No. of ways =

4 alike + 3 alike 1 diff. + 2 alike 2 alike + 2 alike 2 diff. + 4 diff.

$\Rightarrow 0 + 24 + 18 + 540 + 840 = 1422$

Qᵛᵉ In how many ways 4 letters can be selected from letter of the word "INEFFECTIVE".

(A) 80 (B) 89 (C) 51 (D) None of these

Selection × ordering

4 alike = 0

3 alike 1 diff = $^3C_1 \times {}^6C_1 = 6$

EEE FF II

2 alike 2 alike = $^3C_2 = 3$

2 alike 2 diff = $^3C_1 \times {}^6C_2 = 45$

FF EE EI II

EFINCTV 4 diffe. = $^7C_4 = 35$

Total No. of ways =

$0 + 6 + 3 + 45 + 35$

$= 89$

Que No. of Arrangement & Selections:

(1) Independent —

(2) BANANA

(3) ASSASSINATION

(4) proportion. —