VIDYAPEETH

BATCH CODE – 31- AJ102EA

- Subject Name - Mathematics
- Chapter Name – Permutation & Combination

Lecture No. - 03

By – Ranjesh Kashyap

Topics to be Covered

Topic EXPONENT

Topic GAP METHOD

CIRCULAR PERMUTATION

Ex $100! \rightarrow 2$

$$= \left[\frac{100}{2}\right] + \left[\frac{100}{2^2}\right] + \left[\frac{100}{2^3}\right] + \left[\frac{100}{2^4}\right] + \left[\frac{100}{2^5}\right] + \left[\frac{100}{2^6}\right] + \left[\frac{100}{2^7}\right] + \left[\frac{100}{2^8}\right]$$

$$= 50 + 25 + 12 + 6 + 3 + 1 + 0 + 0 \ldots$$

$$= 97$$

$$2^{97}$$

(Ans) $\lfloor 100 \rightarrow 3$

$$= \left[\frac{100}{3}\right] + \left[\frac{100}{3^2}\right] + \left[\frac{100}{3^3}\right] + \left[\frac{100}{3^4}\right] + \left[\frac{100}{3^5}\right] \cdots$$

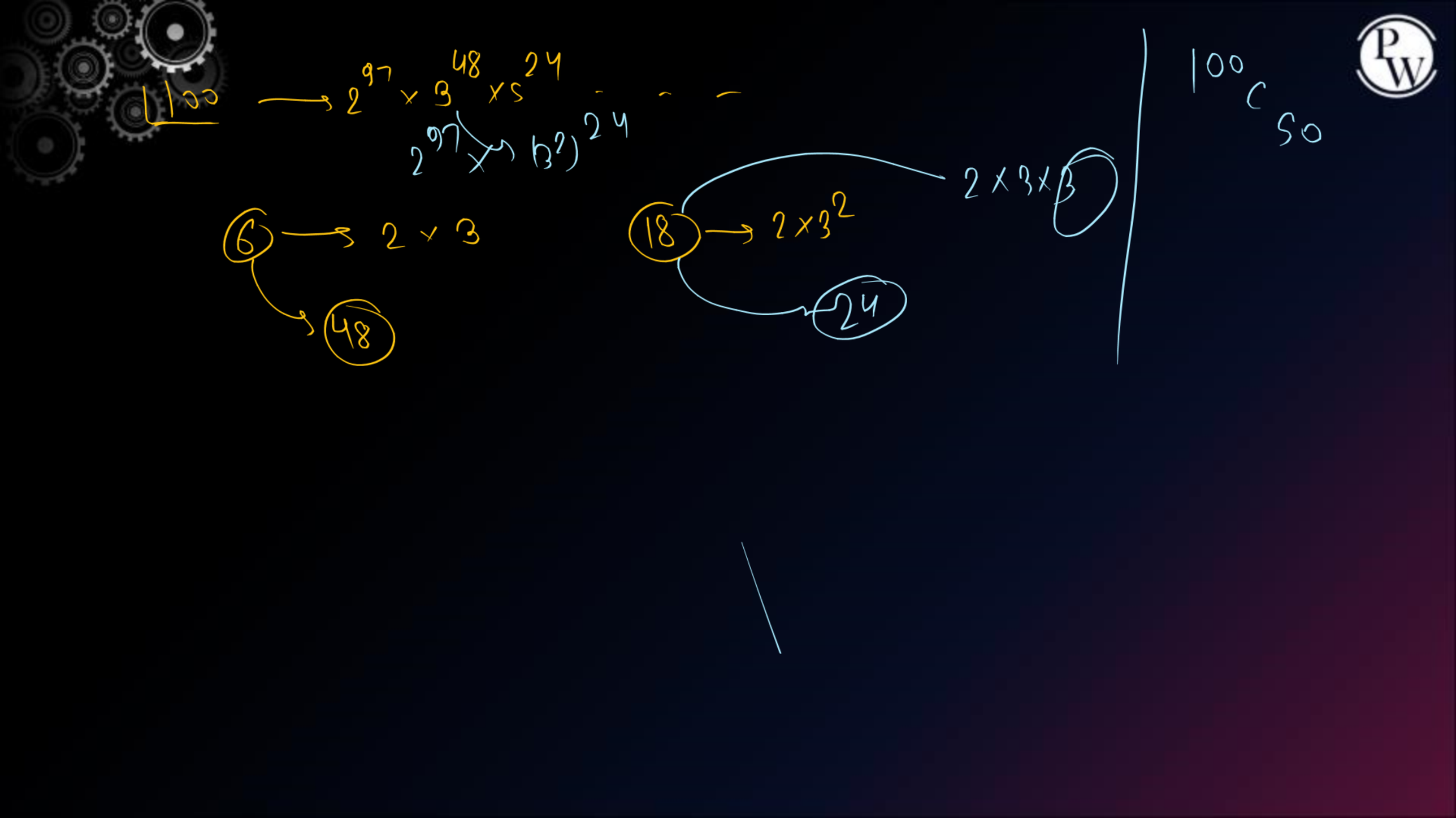
$$= 33 + 11 + 3 + 1 + 0 + 0 \cdots$$

$$= 48$$

$$\left[\frac{100}{5}\right] + \left[\frac{100}{5^2}\right] + \left[\frac{100}{5^3}\right] \cdots$$

$$= 20 + 4 + 0 \cdots$$

$$= 24$$


100
$2^{97} \times 3^{48} \times 5^{24}$
$2^{97} \times (3^2)^{24}$
6
2×3
48
18
2×3^2
24
$2 \times 3 \times 3$
$100C_{50}$

(Q.12) $^{100}C_{50} \rightarrow E_{18} \longrightarrow 2 \times 3^2$

$$= \frac{\lfloor 100}{\lfloor 50 \lfloor 50}$$

$\lfloor 50 = 2^{47} \times 3^{22}$

$= 2^{47} \times (3^2)^{11}$

$\lfloor 100 = 2^{97} \times 3^{48} = 2^{97} \times (3^2)^{24}$

$$= \frac{2^{97} \times (3^2)^{24} \times 3}{2^{47} \times (3^2)^{11} \times 3_2 \times 2^{47} \times (3^2)^{11} \times 3_3}$$

24

11

11

$= 24 - 11 - 11$

$= 2$

$\left[\frac{50}{3}\right] + \left[\frac{50}{3^2}\right] + \left[\frac{50}{3^3}\right] + \left[\frac{50}{3^4}\right]$

$= 16 + 5 + 1 + 0$

$= 22$

$\left[\frac{50}{2}\right] + \left[\frac{50}{2^2}\right] + \left[\frac{50}{2^3}\right] + \left[\frac{50}{2^4}\right] + \left[\frac{50}{2^5}\right]$

$= 25 + 12 + 6 + 3 + 1 + 0$

$= 47$

(Que) V I B G Y O R (B, G)

(BG) V I Y O R

$^7C_7 \times \lfloor 7$ = (B & G) Together + (B & G ✗) Not Together

$\lfloor 7 = \lfloor 6 \times \lfloor 2 + x$

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

$= \lfloor 6 (7-2)$

$= 5 \lfloor 6$

M-II → Gap method

VIBGYOR (B x G)

VIYOR

$5 \times {}^{6}C_{2} \times 2!$

$= 5 \times \frac{6!}{4!2!} \times 2!$

$= 5(6)$

$5 \rightarrow {}^{6}C_{2} \times 2!$

man	wife
7 Red	7 Red
4L + 3G	3L + 4G
3L + 0G	0L + 3G
2L + 1G	1L + 2G
1L + 2G	2L + 1G
0L + 3G	3L + 0G

$$
\begin{aligned}
&{}^{4}C_3 \times {}^{3}C_0 \times {}^{3}C_0 \times {}^{4}C_3 \\
&+ {}^{4}C_2 \times {}^{3}C_1 \times {}^{3}C_1 \times {}^{4}C_2 \\
&+ {}^{4}C_1 \times {}^{3}C_2 \times {}^{3}C_2 \times {}^{4}C_1 \\
&+ {}^{4}C_0 \times {}^{3}C_3 \times {}^{3}C_3 \times {}^{4}C_0 =
\end{aligned}
$$

MAN

Geometrical Problems:

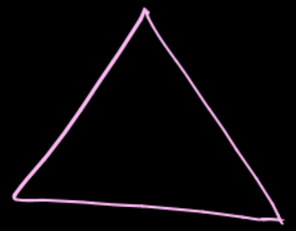
(A) n_{C_2}

(B) n_{C_3}

n_{C_2} = n sides + n diagonal

n diagonal = $n_{C_2} - n$

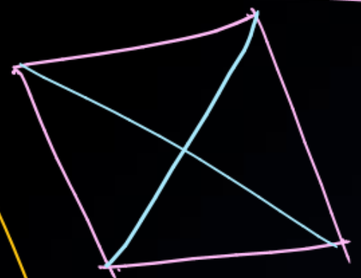
#



3 → Points

$^3C_2 = 3$ = 3 sides

0 diagonals



$^4C_2 = 6$

4 → sides

2 → diagonals

$^5C_2 = 10$

5 → sides

5 → diagonals

$^6C_2 = 15$

6 → sides

9 → diagonal

(Q) $^nC_2 - n = 44$

$\frac{n(n-1)}{1\times 2} - n = 44$

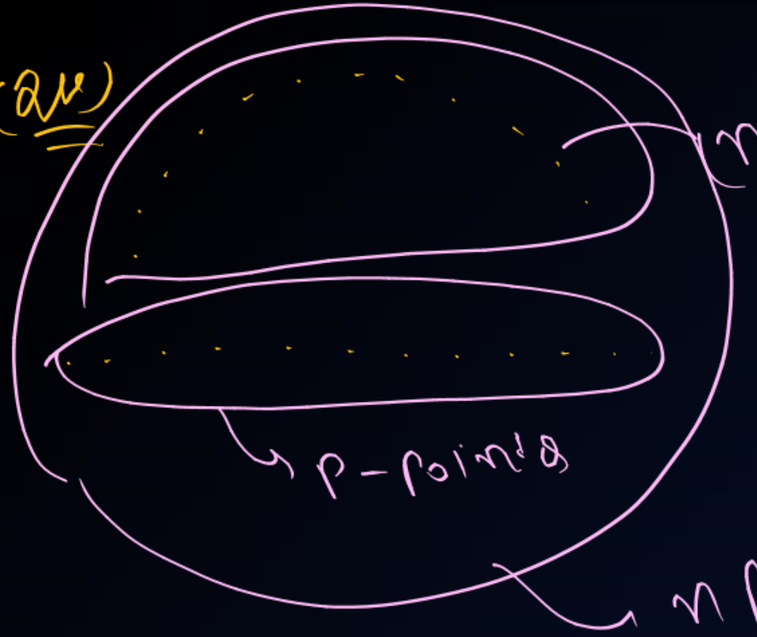
$n^2 - n - 2n = 88$

$n^2 - 3n - 88 = 0$

$(n-11)(n+8) = 0$

$n = 11, -8$ ✗

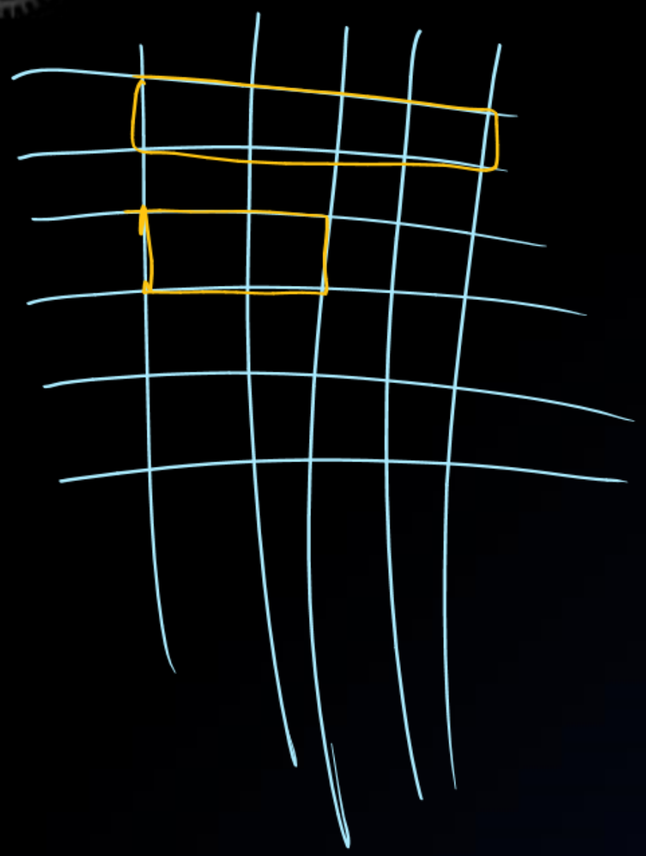
(Q)



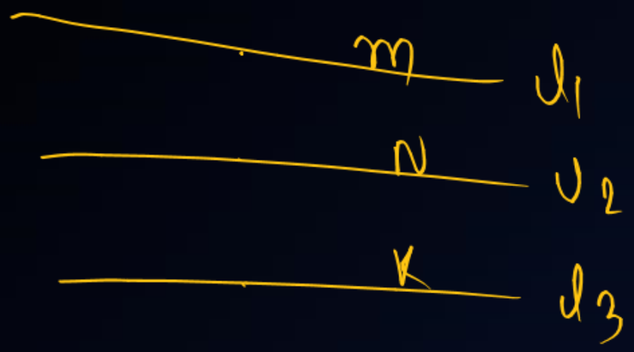
① $^nC_2 - {}^PC_2 + 1$

② $^nC_3 - {}^PC_3 + 0$

Or



$= {}^{6}C_2 \times {}^{5}C_2$



$$(m+n+k)C_3 - {}^{m}C_3 - {}^{n}C_3 - {}^{k}C_3$$

$^9C_2 \times {}^9C_2$

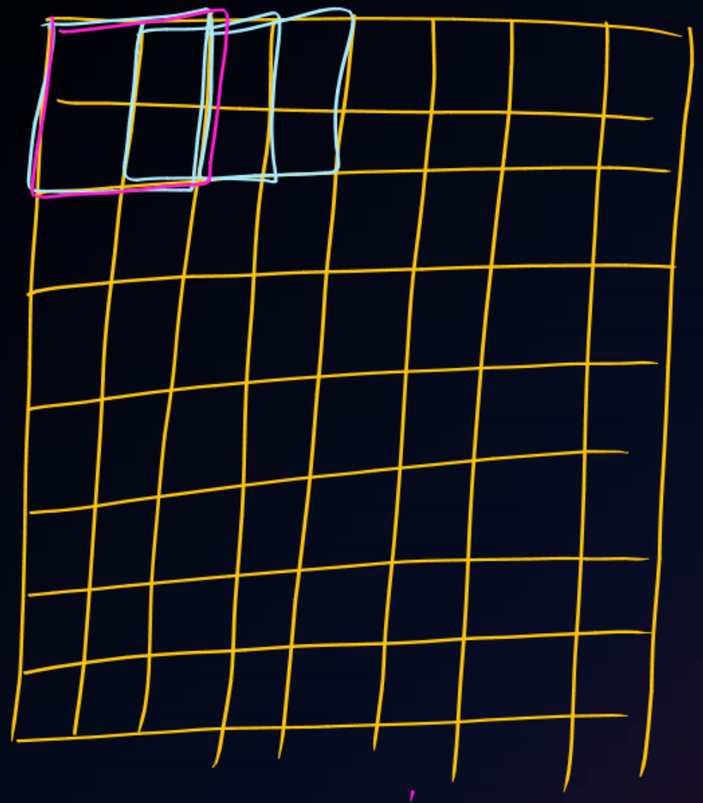
$1 \times 1 \rightarrow 8^2$

$2 \times 2 \rightarrow 7^2$ +

:

+

$8 \times 8 \rightarrow 1^2$

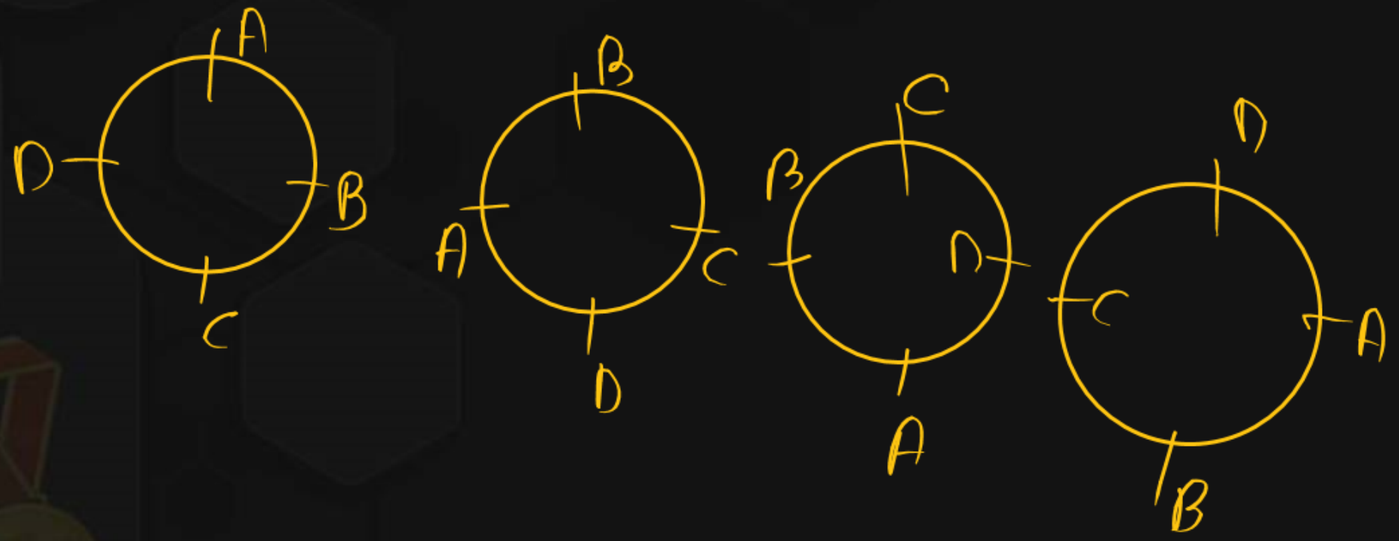


CIRCULAR PERMUTATIONS

ABCD BCDA CDAB DABC

$\therefore$

$\underline{n} = n \underline{n-1}$



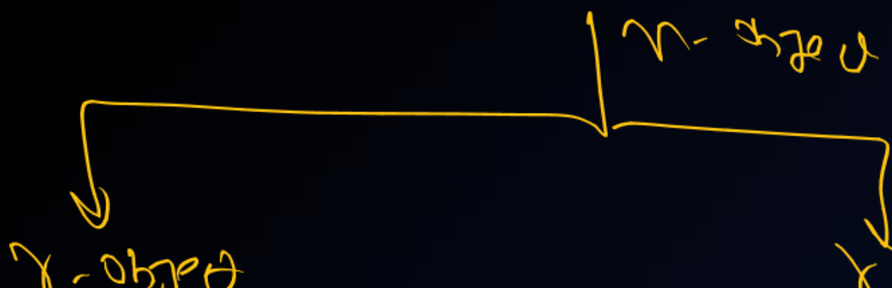
$\underline{|n-1}$

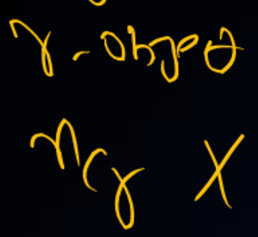
$AC \neq CW$

$\frac{\underline{|n-1}}{2}$

$AC = CW$

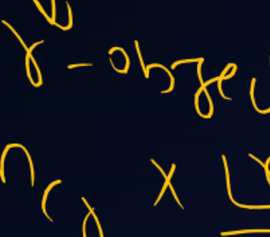
(ii) ${}^{10}C_6 \times \frac{\underline{|6-1}}{2}$





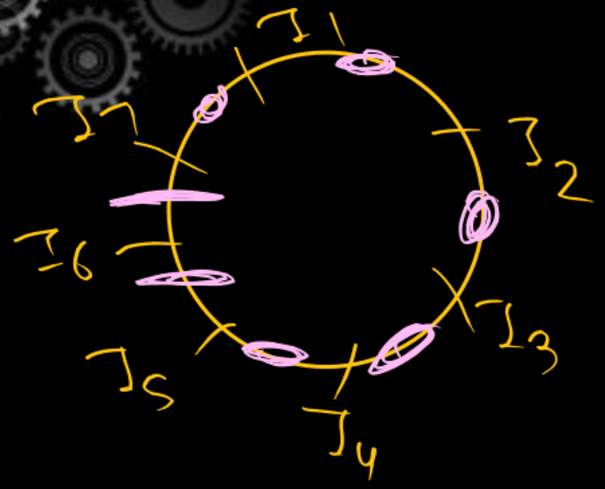
${}^nC_r \times \underline{|r-1}$

$AC \neq CW$



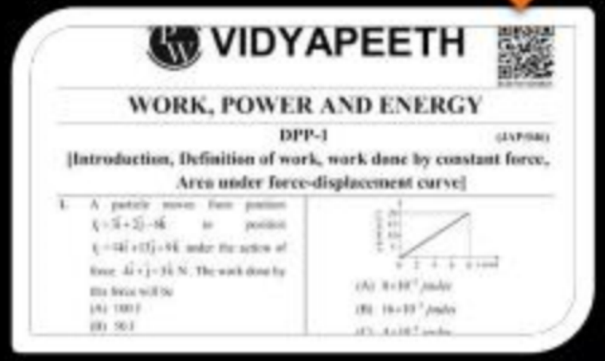
${}^nC_r \times \frac{\underline{|r-1}}{2}$

$AC = CW$



$\underline{\lfloor 7-1}$ $\times {}^{7}C_{7} \times \lfloor 7$

Solve the DPP


VIDYAPEETH

WORK, POWER AND ENERGY

DPP-1

[Introduction, Definition of work, work done by constant force, Area under force-displacement curve]

Class 11 JEE

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Thank You!!!!
Baccho...

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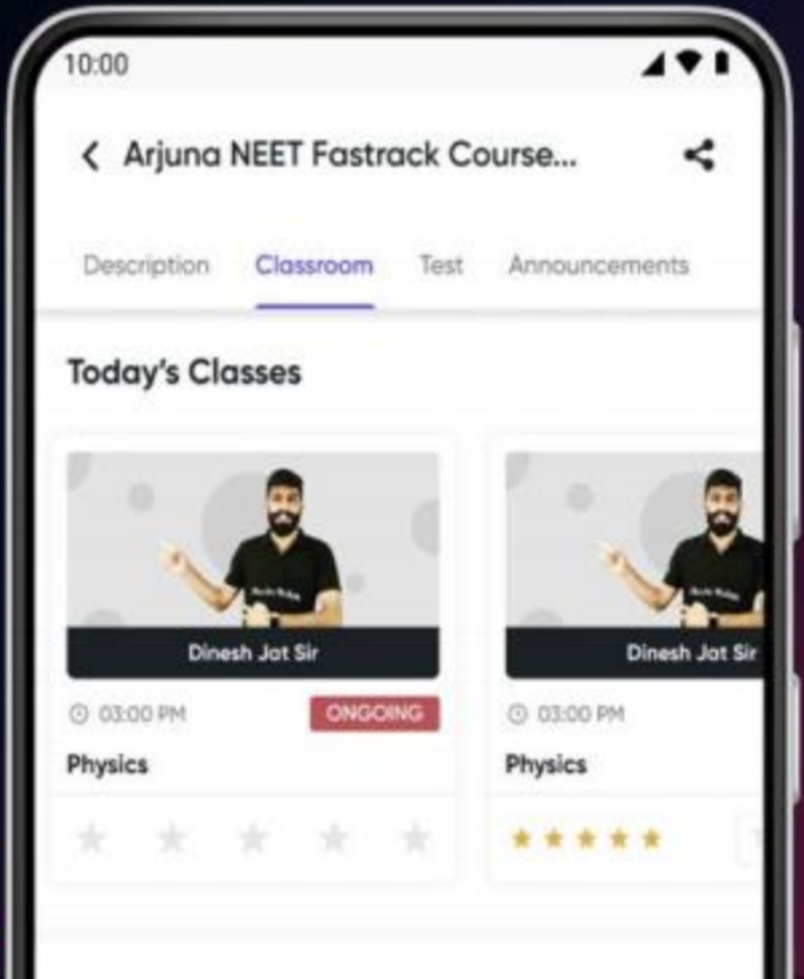

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