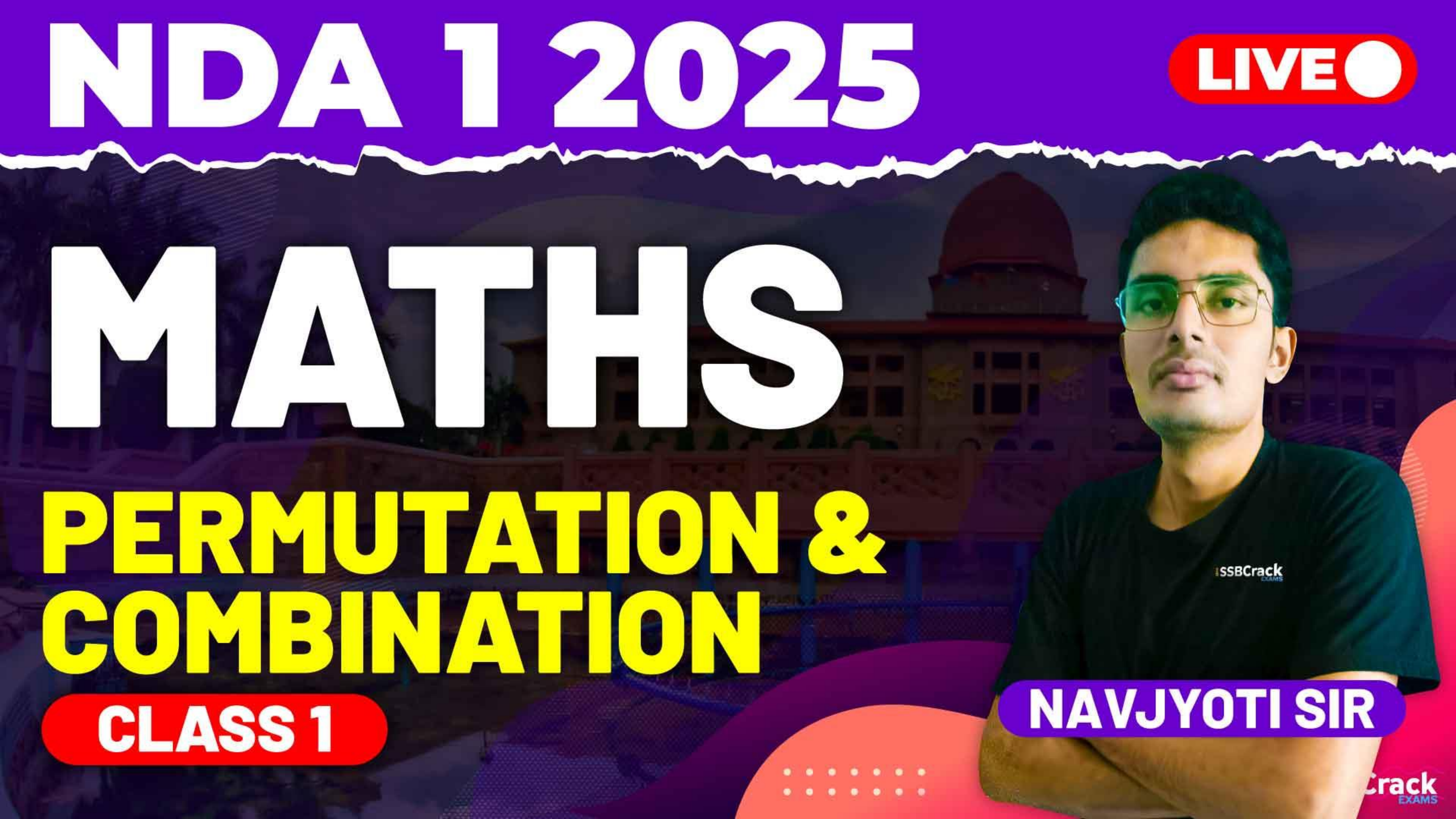

NDA 1 2025
LIVE
MATHS
PERMUTATION & COMBINATION
CLASS 1
NAVJYOTI SIR
SSBCrack EXAMS
Crack EXAMS

6 Nov 2024 Live Classes Schedule

8:00AM	06 NOVEMBER 2024 DAILY CURRENT AFFAIRS	RUBY MA'AM
9:00AM	06 NOVEMBER 2024 DAILY DEFENCE UPDATES	DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:30AM	OVERVIEW OF OIR & PRACTICE	ANURADHA MA'AM

NDA 1 2025 LIVE CLASSES

11:30AM	GK - MEDIEVAL HISTORY - CLASS 2	RUBY MA'AM
1:00PM	CHEMISTRY MCQ - CLASS 4	SHIVANGI MA'AM
4:00PM	MATHS - PERMUTATION & COMBINATION - CLASS 1	NAVJYOTI SIR
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 1	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	GK - MEDIEVAL HISTORY - CLASS 2	RUBY MA'AM
1:00PM	CHEMISTRY MCQ - CLASS 4	SHIVANGI MA'AM
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 1	ANURADHA MA'AM
7:00PM	MATHS - GEOMETRY - CLASS 2	NAVJYOTI SIR

AFCAT 1 2025 LIVE CLASSES

4:00PM	STATIC GK - COUNTRY CAPITAL CURRENCY - CLASS 2	DIVYANSHU SIR
5:30PM	ENGLISH - ORDERING OF SENTENCES - CLASS 1	ANURADHA MA'AM

FACTORIAL

$n!$ or $\underline{|n}$ $= n \times (n-1) \times (n-2) \times \ldots \times 1$

$6! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 720$

$4! = 4 \times 3 \times 2 \times 1 = 24$

$1! = 1$

$2! = 2 \times 1 = 2$

$3! = 3 \times 2 \times 1 = 6$

$4! = 24$

$5! = 120$

$6! = 720$

FACTORIAL

→ Factorial is defined for whole numbers.

$0! = 1$

→ $6! = 6 \times \underbrace{5 \times 4 \times 3 \times 2 \times 1}$

$= 6 \times 5!$

$= 6 \times 5 \times 4!$

$n! = n \cdot (n-1)!$

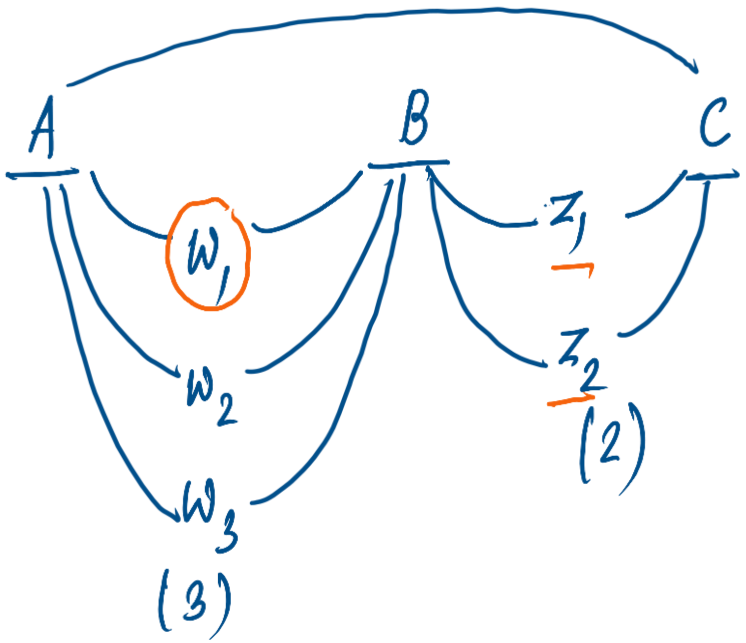
$= n(n-1)(n-2)!$

SSBCrack EXAMS

FUNDAMENTAL PRINCIPLE OF COUNTING

Multiplication Principle

Suppose an event E can occur in m different ways and associated with each way of occurring of E, another event F can occur in n different ways, then the total number of occurrence of the two events in the given order is m × n.



Total ways of reaching C from A

$3 \times 2 = 6$ ways

FUNDAMENTAL PRINCIPLE OF COUNTING

Addition Principle

If an event E can occur in m ways and another event F can occur in n ways, suppose that both can not occur together, then E or F can occur in $m + n$ ways.

SSBCrack EXAMS

EXAMPLE

In a class, there are 27 boys and 14 girls. The teacher wants to select 1 boy and 1 girl to represent the class for a function. In how many ways can the teacher make this selection?

$27 \times 14 =$

EXAMPLE

(i) How many numbers are there between 99 and 1000 having 7 in the units place?

(ii) How many numbers are there between 99 and 1000 having atleast one of their digits 7?

$99 - 10000 \longrightarrow$ all will be 3-digit.

(i) $\underset{(H)}{\underline{9}}$ $\underset{(T)}{\underline{10}}$ $\underset{(O)}{\underline{1}}$ $= 9 \times 10 \times 1 = \underline{90 \text{ ways}}$

(0-9)

(ii) Total numbers possible − numbers having no digit as 7.

(ii) Total numbers possible − Numbers having no digit as 7

$\underline{9}$ $\underline{10}$ $\underline{10}$ $\underline{8}$ $\underline{9}$ $\underline{9}$

$9 \times 10 \times 10 - 8 \times 9 \times 9$

$900 - 648 = 252$

PERMUTATIONS

Any arrangement of some or all the things out of a given number of things in a definite order is called a permutation.

3 objects, taken 2 at a time to be arranged,

a b c

ab

ba

bc

cb

ca

ac

6

Number of permutations of 'n' objects taken r at a time :

$$^nP_r = \frac{n!}{(n-r)!} \; ; \quad 0 < r \le n$$

$$^6P_3 = \frac{6!}{(6-3)!} = \frac{6!}{3!} = \frac{6 \times 5 \times 4 \times \cancel{3!}}{\cancel{3!}} = 6 \times 5 \times 4$$

$$^7P_2 = \frac{7!}{(7-2)!} = \frac{7!}{5!} = \frac{7 \times 6 \times \cancel{5!}}{\cancel{5!}} = 7 \times 6$$

$$^nP_r = \underbrace{n(n-1)(n-2)\ldots(n-r+1)}_{(r \text{ nos.})}$$

PERMUTATIONS OF n OBJECTS TAKEN n AT A TIME

Repetition Allowed

n^n

Repetition not Allowed

$n(n-1) \ldots 1$

$= n!$

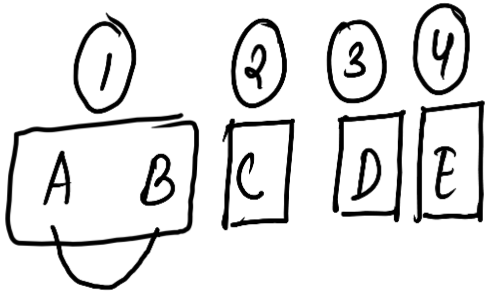
EXAMPLE

In how many ways can 5 children be arranged in a line such that

(i) two particular children of them are always together

(ii) two particular children of them are never together.

(i)



$4! \times 2! = 24 \times 2 = 48$

(ii) Total permutations − together permutations $= 5! - 48$

$= 120 - 48$

$= 72$

EXAMPLE

In how many ways 3 mathematics books, 4 history books, 3 chemistry books and 2 biology books can be arranged on a shelf so that all books of the same subjects are together.

1: $M_1 \quad M_2 \quad M_3$

2: $H_1 \quad H_2 \quad H_3 \quad H_4$

3: $C_1 \quad C_2 \quad C_3$

4: $B_1 \quad B_2$

$$4! \times 3! \times 4! \times 3! \times 2!$$

(4 groups)

SSBCrack EXAMS

PERMUTATIONS WHEN OBJECTS ARE NOT DISTINCT

The number of permutations of n objects of which p_1 are of one kind, p_2 are of second kind, ..., p_k are of kth kind and the rest if any, are of different kinds is

$$\frac{n!}{p_1!\ p_2!\ \cdots\ p_k!}$$

EXAMPLE

If all permutations of the letters of the word AGAIN are arranged in the order as in a dictionary. What is the 49th word?

A G A I N

A | G A I N → $4! = 24$ words

G | A A I N → $\frac{4!}{2!} = \frac{24}{2} = 12$ words

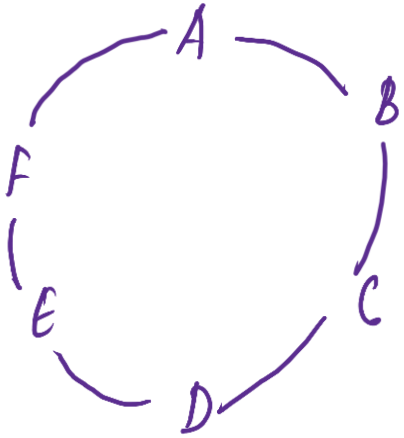
$24 + 12 = 36$ words

I | A A G N → $\frac{4!}{2!} = \frac{24}{2} = 12$ words

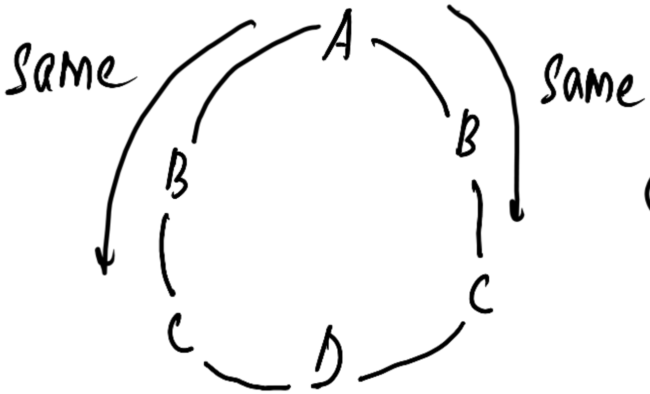
$36 + 12 = 48$ words

49th word → will start with N → NAAGI

CIRCULAR PERMUTATIONS



for n objects, $\longrightarrow$ $\boxed{(n-1)!}$



$\boxed{\frac{1}{2}(n-1)!}$

SSBCrack EXAMS

NUMBER OF PERMUTATIONS UNDER CERTAIN CONDITIONS

The number of permutation of n different things taken all together when r particular things are to be place at some r given places $= {}^{n-r}P_{n-r} = (n-r)!$

The number of permutations of n different things taken r at a time when m particular things are to be placed at m given places $= {}^{n-m}P_{r-m}$.

SSBCrack EXAMS

NUMBER OF PERMUTATIONS UNDER CERTAIN CONDITIONS

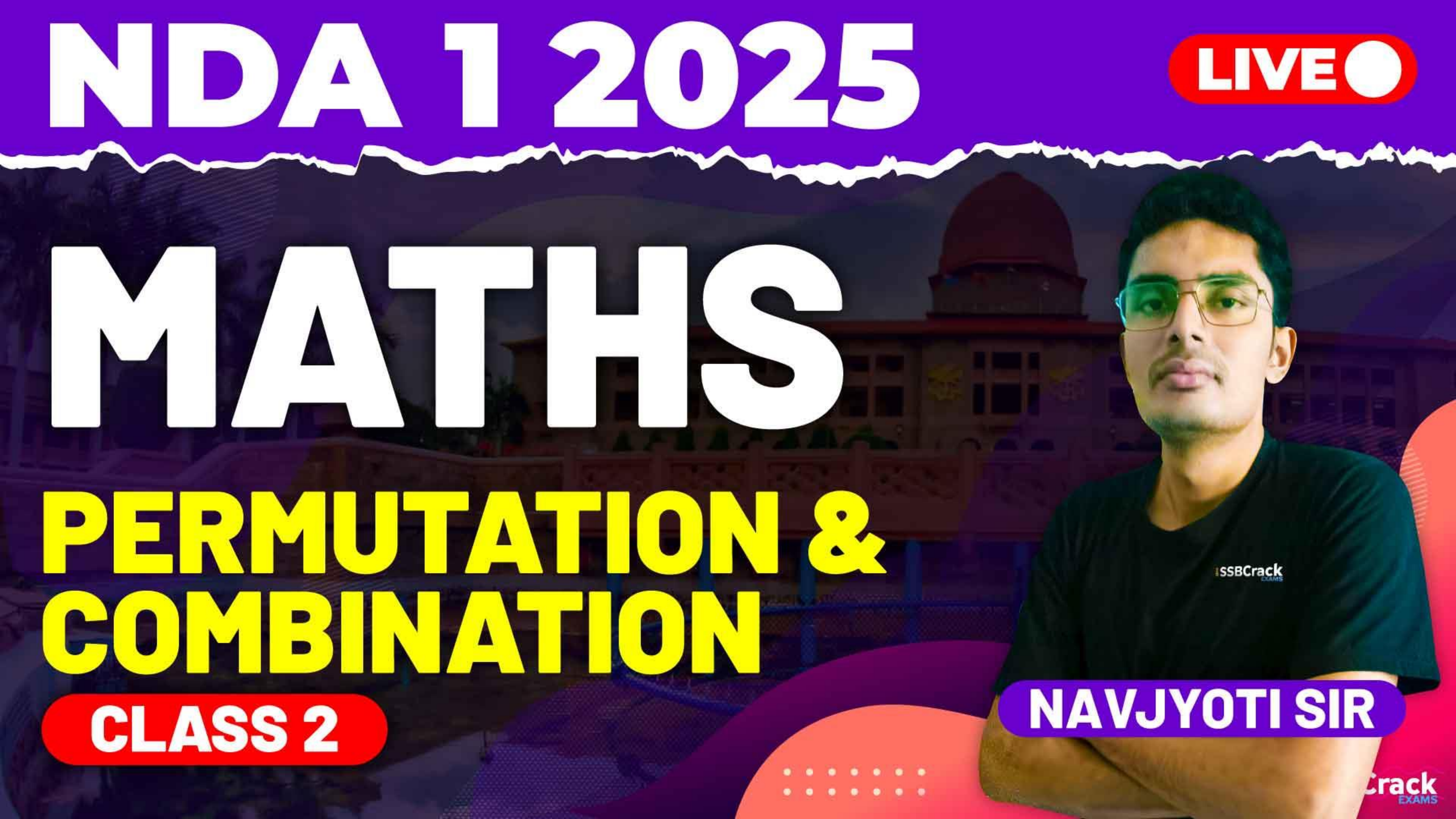
Number of permutations of n different things, taken r at a time, when a particular things is to be always included in each arrangement, is $r.\ {}^{n-1}P_{r-1}$

Number of permutation of n different things, taken r at a time, when m particular thing is never taken in each arrangement is ${}^{n-m}P_r$.

NUMBER OF PERMUTATIONS UNDER CERTAIN CONDITIONS

Number of permutations of n different things, taken all at a time, when m specified things always come together is $m! \times (n-m+1)!$

Number of permutations of n different things, taken all at a time, when m specified things never come together is $n! - m! \times (n-m+1)!$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