



Permutation and Combination

Permutation :- निश्चित वस्तुओं का एक निर्धारित क्रम में विन्यास, उन वस्तुओं का क्रमचय कहलाता है।

Factorial $\rightarrow ! / L$

$$0! = 1$$

$$1! = 1$$

$$2! = 2 \times 1$$

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

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

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

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

$$7! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

$$8! = 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$$

$$n! = n(n-1)(n-2)(n-3)(n-4) \dots \infty$$

$$2n! = 2n(2n-1)(2n-2)(2n-3)(2n-4) \dots \infty$$

$$(n+1)! = (n+1)n(n-1)(n-2)(n-3) \dots \infty$$

$$(2n+1)! = (2n+1)2n(2n-1)(2n-2)(2n-3) \dots \infty$$

Home work

$$3! \times 2!$$

$$= 3 \times 2 \times 1 \times 2 \times 1$$

$$= 6 \times 2 = 12$$

$$Q:- 4! \times 3!$$

$$Q:- 5! \times 4!$$

$$Q:- 6! \times 4!$$

$$Q:- 5! \times 6!$$

$$Q. \frac{5!}{3!} = \frac{5 \times 4 \times 3!}{3!} = 20$$

$$Q. \frac{6!}{4!}$$

$$Q. \frac{7!}{5!}$$

$$Q. \frac{6! \times 5!}{4!} \quad Q. \frac{7! \times 6!}{4! \times 5!}$$

Permutation

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

Q.:

$${}^7 P_5$$

$$= \frac{7!}{(7-5)!} = \frac{7!}{2!} = \frac{7 \times 6 \times 5 \times 4 \times 3 \times 2!}{2!} = 840$$

Case-1

$${}^n P_2 = 20$$

$$\frac{n!}{(n-2)!} = 20$$

$$\frac{n(n-1)(\cancel{n-2})!}{\cancel{(n-2)}!} = 20$$

$$n(n-1) = 20$$

$$n^2 - n - 20 = 0$$

$$n^2 - 5n + 4n - 20 = 0$$

$$n(n-5) + 4(n-5) = 0$$

$$(n+4)(n-5) = 0$$

$$n = 4 / 5$$

04

Do not write your name or any mark of identification in any part of your answer Book. For Writing an answer. (Including heading) Use

second Method

$${}^n P_2 = 20$$

$$n!$$

$$\frac{n!}{(n-2)!} = 20$$

$$\frac{n(n-1)(n-2)!}{(n-2)!} = 5 \times 4$$

$$n(n-1) = 5 \times 4$$

$$n = 5$$

Case-II

$$Q: {}^7 P_8 = 42$$

$$\frac{7!}{(7-8)!} = 42$$

$$\frac{7!}{42} = (7-8)!$$

$$\frac{7 \times 6 \times 5!}{42} = (7-8)!$$

$$5! = (7-8)!$$

$$5 = 7 - 8$$

$$5 - 7 = -8$$

$$2 = -8$$

$$8 = 2$$

Case-III

$${}^n P_3 = 60$$

$$\frac{n!}{(n-3)!} = 60$$

$$\frac{n(n-1)(n-2)\cancel{(n-3)!}}{\cancel{(n-3)!}} = 5 \times 4 \times 3$$

$$n(n-1)(n-2) = 5 \times 4 \times 3$$

$$n = 5$$

Case-VI

$$Q:- {}^n P_4 = 12 \times {}^n P_2$$

$$\frac{n!}{(n-4)!} = 12 \times \frac{n!}{(n-2)!}$$

$$\frac{(n-2)!}{(n-4)!} = 12$$

$$\frac{(n-2)(n-3)\cancel{(n-4)!}}{\cancel{(n-4)!}} = 12$$

$$n^2 - 3n - 2n + 6 - 12 = 0$$

$$n^2 - 5n - 6 = 0$$

$$n^2 - 6n + n - 6 = 0$$

$$n(n-6) + 1(n-6) = 0$$

$$06 \quad (n+1)(n-6) = 0$$

$$n = -1/6$$

$${}_{2n}P_3 = 100 \times {}_n P_2$$

$$\frac{2n!}{(2n-3)!} = 100 \times \frac{n!}{(n-2)!}$$

$$\frac{2n(2n-1)(2n-2)(2n-3)!}{(2n-3)!} = 100 \times \frac{n(n-1)(n-2)(n-3)!}{(n-3)!}$$

$$\frac{2n(2n-1) \cdot 2(n-1)}{n(n-1)} = 100$$

$$4(2n-1) = 100$$

$$2n-1 = \frac{100}{4} = 25$$

$$2n-1 = 25$$

$$2n = 25 + 1$$

$$2n = 26$$

$$n = \frac{26}{2} = 13$$