

NCERT CHAPTER 6

Permutations and Combinations

Fundamental counting principle, factorials, permutations with repetition, bundle/gap methods, and combinations.

🕒 Revision Time: 30 mins 🎯 Target: 7–8 Marks 📖 Textbook: [kemh106.pdf](#)

⚡ Essential Formulas & Concept Summary

1. COUNTING & FORMULATIONS

${}^n P_r = \frac{n!}{(n-r)!} \quad (\text{Arrangements: ORDER MATTERS})$
 ${}^n C_r = \frac{n!}{r!(n-r)!} \quad (\text{Selections: ORDER DOES NOT MATTER})$

$${}^n C_a = {}^n C_b \implies a = b \quad \text{or} \quad a + b = n$$

$${}^n C_r + {}^n C_{r-1} = {}^{n+1} C_r \quad (\text{Pascal's Rule})$$

2. IDENTICAL OBJECTS & BUNDLE METHOD

- Permutations of identical objects: $\frac{n!}{p_1! p_2! \dots}$.
- Bundle Method: Group objects that must stay together into 1 entity, multiply by internal permutations.
- Never together = Total arrangements — Always together.

Top Expected Exam Questions (Step-by-Step Solutions)

Question 1: INDEPENDENCE Permutations

4–5 Marks

Find arrangements of **INDEPENDENCE** (12 letters: N:3, E:4, D:2, I:1, P:1, C:1):

- (i) All vowels occur together
- (ii) Vowels never occur together

Exam Traps & Silly Mistakes

Trap 1: Forgetting Internal Bundle Permutations

Don't forget to arrange items inside the bundle (e.g. $5!/4! = 5$ ways).

Quick Self-Check

Quiz 1: If ${}^nC_9 = {}^nC_8$, what is n ?