NEET · CLASS 12 BIOLOGY

Principles of Inheritance and Variation — Revision Sheet

Genetics carries a big share of NEET Biology marks and rewards practice more than reading. Work through these questions, then take a full test in the app to see which parts of the chapter you are weak in.

Quick NCERT recap

- Mendel's laws: dominance, segregation (law of purity of gametes) and independent assortment.
- Monohybrid ratio 3:1 phenotypic, 1:2:1 genotypic; dihybrid ratio 9:3:3:1.
- Incomplete dominance (Mirabilis, 1:2:1) and co-dominance (ABO blood group) are exceptions to dominance.
- Linked genes do not assort independently; recombination frequency measures the map distance between them.
- Haemophilia and colour blindness are X-linked recessive; sickle cell anaemia and thalassaemia are autosomal recessive.

Exam tips

- Practise pedigree questions — one comes almost every year.
- Learn the difference between Down's syndrome (trisomy 21), Klinefelter's (XXY) and Turner's (XO) by chromosome number.
- For dihybrid crosses, use the forked-line method instead of drawing a full 16-box Punnett square in the exam.

Practice questions with answers

Q1. A cross between two pink flowered Mirabilis jalapa plants gives what phenotypic ratio?

(A) 3 red : 1 white
✓ (B) 1 red : 2 pink : 1 white
(C) 9:3:3:1
(D) All pink

Answer: (B) 1 red : 2 pink : 1 white

Why: Flower colour in Mirabilis shows incomplete dominance. The heterozygote is pink, so a pink x pink cross gives 1 red (RR) : 2 pink (Rr) : 1 white (rr) — the genotypic and phenotypic ratios are the same.

Q2. ABO blood grouping in humans is an example of:

(A) Incomplete dominance only
✓ (B) Multiple alleles and co-dominance
(C) Polygenic inheritance
(D) Sex-linked inheritance

Answer: (B) Multiple alleles and co-dominance

Why: Three alleles (I^A, I^B, i) control the gene, so it shows multiple allelism. I^A and I^B are co-dominant, giving the AB blood group; both are dominant over i.

Q3. A colour blind man marries a woman with no carrier gene. Their children will be:

(A) All sons colour blind
(B) All daughters colour blind
✓ (C) All children normal, daughters carriers
(D) Half the sons colour blind

Answer: (C) All children normal, daughters carriers

Why: Colour blindness is X-linked recessive. The father gives his X (carrying the allele) to all daughters, making them carriers, and his Y to all sons, so no child is colour blind.

Q4. Down's syndrome is caused by:

✓ (A) Trisomy of chromosome 21
(B) Monosomy of chromosome 21
(C) XXY condition
(D) Deletion in chromosome 5

Answer: (A) Trisomy of chromosome 21

Why: An extra copy of chromosome 21 (trisomy 21, 45 + XX/XY = 47 chromosomes) causes Down's syndrome. It was first described by Langdon Down and its chance rises with the age of the mother.