

Practice Test 04 — Answer Key

Modules 8-9: Cell Division & Inheritance

Part A: Multiple Choice

Module 8: Cell Division

1. **B** — DNA is replicated during S (Synthesis) phase.
2. **C** — Prophase, Metaphase, Anaphase, Telophase (PMAT).
3. **B** — Chromosomes line up at the cell equator during Metaphase.
4. **A** — Mitosis produces two genetically identical diploid cells.
5. **B** — Meiosis occurs only in germ cells to produce gametes (sex cells).
6. **B** — Crossing over occurs during Prophase I of Meiosis.
7. **C** — Gametes are haploid (n), so $46/2 = 23$ chromosomes.
8. **B** — Nondisjunction can result in trisomy conditions like Down Syndrome (Trisomy 21).

Module 9: Inheritance

1. **B** — An alternate form of a gene is an allele.
2. **B** — Two identical alleles (AA) = homozygous dominant.
3. **C** — $Tt \times tt \rightarrow 50\% Tt$ (tall), $50\% tt$ (short). Probability of short = 50%.
4. **C** — Incomplete dominance produces an intermediate (blended) phenotype.
5. **B** — Blood type AB is codominance; both A and B antigens are expressed.
6. **B** — Genes on the X chromosome produce sex-linked traits.
7. **B** — Males have only one X, so a single recessive allele on the X is expressed (no second X to mask it).
8. **C** — A pedigree tracks traits across generations in a family.

Part B: Fill in the Blank

1. Cytokinesis
2. **Gametes** (sex cells / sperm and eggs)
3. **Cancer**
4. **Genetics**
5. **Phenotype; Genotype**
6. **Recessive**

Part C: Short Answer

1. Three Differences Between Mitosis and Meiosis:

Feature	Mitosis	Meiosis
Divisions	1	2
Result	2 identical diploid cells	4 unique haploid cells
Purpose	Growth and repair	Produce gametes
Crossing over	No	Yes (Prophase I)

2. Punnett Square: $Aa \times Aa$

	A	a
A	AA	Aa
a	Aa	aa

- **Genotypic ratio:** 1 AA : 2 Aa : 1 aa
- **Phenotypic ratio:** 3 dominant : 1 recessive

3. **Independent Assortment:** Mendel's Law of Independent Assortment states that genes for different traits are sorted into gametes independently of one another. This occurs during Metaphase I of meiosis, when homologous chromosome pairs line up randomly

at the cell equator. This means the allele a gamete receives for one gene does not affect which allele it receives for another gene (as long as they are on different chromosomes).