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Daffodil International University

**Department of Genetic Engineering and Biotechnology**
Faculty of Health and Life Sciences
B. Sc. (Hons.) in Genetic Engineering and Biotechnology
Midterm Examination Fall 2026

**Course Code:** 0512-1201 **Course Title:** Principles of Genetics
**Level and Term:** L1, T2 **Section: 262-A** **Course Teacher Initials:** AR
**Time:** 1 Hour 30 Minutes **Total Marks:** 25

**Answer the Following Questions:**

| | | | | Marks |
|---|---|---|---|---|
| 1 | (a) | Define phenotype, genotype, and variety with suitable examples. | [CLO1, PLO1, C1] | 3.0 |
| | (b) | Illustrate Mendel's experiments on Pisum sativum, highlighting his experimental approach and major findings. | [CLO1, PLO1, C5] | 2.0 |
| 2 | (a) | Identify the major exceptions to Mendelian inheritance and provide one example of each. | [CLO2, PLO2, C1] | 3.0 |
| | (b) | Compare Mendelian and non-Mendelian inheritance based on their inheritance patterns, genetic mechanisms, and phenotypic ratios. | [CLO3, PLO1, C4] | 2.0 |
| 3 | (a) | Analyze how incomplete dominance deviates from the classical Mendelian monohybrid ratio, using a suitable genetic cross and Punnett square. | [CLO3, PLO1, C4] | 2.0 |
| | (b) | Construct a genetic cross and Punnett square to demonstrate how a homozygous recessive genotype at one locus masks the expression of another gene. | [CLO3, PLO2, C3] | 3.0 |
| 4 | (a) | Define pleiotropism. Explain the major features of pleiotropy with a suitable example. | [CLO1, PLO1, C5] | 2.0 |
| | (b) | Define linkage group. Construct the linkage map of chromosome 1 and 3 of *Drosophila melanogaster*. | [CLO3, PLO2, C6] | 3.0 |
| 5 | (a) | Define a chromosome map and interpret the cytogenetic location 11p15.5, explaining the significance of each component of the notation. | [CLO2, PLO2, C2] | 3.0 |
| | (b) | Explain multiple allelism and analyze the inheritance pattern resulting from a cross between a homozygous chinchilla rabbit and a heterozygous Himalayan rabbit, using a Punnett square. | [CLO2, PLO2, C3] | 2.0 |

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