**Unit 7 - Test Practice Questions**

1. **In fruit flies, the gene for wing type is carried on an autosome. The allele for wild-type wings is dominant to the allele for vestigial wings.**

**The gene for eye color is carried on the X chromosome. The allele for red eyes is dominant to the allele for white eyes.**

A female heterozygous for wild-type wings and heterozygous for red eyes is crossed with a male with vestigial wings and white eyes. What proportion of the offspring are expected to be males with vestigial wings and white eyes? **Give your answer as a fraction or decimal point**.

1. **ABO blood type is a trait controlled by multiple alleles for a single gene. The alleles *IA* and *IB* are completely dominant to the *i* allele. The data table below shows the approximate genotype frequencies of ABO blood types for a large population.**

|  |  |  |
| --- | --- | --- |
| **Phenotype** | **Genotype** | **Frequency** |
| **Type A** | *IAIA* or *IAi* | 0.35 |
| **Type B** | *IBIB* or *IBi* | 0.25 |
| **Type AB** | *IAIB* | 0.1 |
| **Type O** | *ii* | 0.3 |

**The Hardy-Weinberg principle can be applied to a genetic locus with three alleles by using the following equation:**

**p2 + q2 + r2 +2pq + 2pr +2qr = 1**

**p +q + r = 1**

Assuming that the population is in Hardy-Weinberg equilibrium with respect to blood type, what is the frequency of the *i* allele? **Give your answer to two decimal places**.

1. Huntington’s is an inherited autosomal dominant disease. If two parents who are heterozygous for the disease have 2 children, what is the probability that neither child will have Huntington’s? **Give your answer as a fraction or decimal.**
2. In a population of flowers, long stems (L) are dominant to short stems (l) and red flowers (R) are dominant to blue flowers (r). The following cross was performed and the phenotype results of 1000 offspring are recorded below.

LlRr x llrr

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Long, Red | Long, blue | Short, Red | Short, blue |
| Observed | 248 | 252 | 247 | 253 |
| Expected | 250 | 250 | 250 | 250 |

Which statement best explains the observed results?

1. The genes for stem length and flower color are located on different chromosomes.
2. The genes for stem length and flower color are located far apart on the same chromosome.
3. The genes for stem length and flower color are located close together on the same chromosome.
4. The genes for stem length and flower color are sex-linked.
5. In a population of bees, long bodies (L) are dominant to short bodies (l) and Black stripes (B) are dominant to brown stripes (b). The following cross was performed and the phenotype results of 1000 offspring are recorded below.

LlBb x llbb

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Long, Black | Long, brown | Short, black | Short, brown |
| Observed | 495 | 6 | 5 | 494 |
| Expected | 250 | 250 | 250 | 250 |

Which statement best explains the observed results?

1. The genes for body length and stripe color are located on different chromosomes.
2. The genes for body length and stripe color are located far apart on the same chromosome.
3. The genes for body length and stripe color are located close together on the same chromosome.
4. The genes for body length and stripe color are sex-linked.