BIOL-8 Practice Test 06

Module 10: Inheritance

Instructions: This practice test covers material from Module 10. Answer all questions to the best of your ability.

Part A: Multiple Choice

Mendelian Genetics Foundations

1. An alternate form of a gene is called a(n): A) Chromosome B) Allele C) Genotype D) Phenotype

2. What is the difference between a genotype and a phenotype? A) They mean the same thing B) Genotype is the genetic makeup; phenotype is the physical appearance C) Genotype is the physical appearance; phenotype is the genetic makeup D) Genotype only refers to dominant traits

3. An organism with two identical alleles for a trait (e.g., **BB**) is: A) Heterozygous B) Homozygous C) Hemizygous D) Polygenic

4. An organism with two different alleles for a trait (e.g., **Bb**) is: A) Homozygous dominant B) Homozygous recessive C) Heterozygous D) Codominant

5. Gregor Mendel is called the "Father of Genetics" because of his experiments with: A) Fruit flies B) Bacteria C) Pea plants D) Mice

Punnett Squares & Crosses

6. In a cross between two heterozygous parents (**Aa** × **Aa**), what fraction of the offspring will show the recessive phenotype? A) 1/4 B) 1/2 C) 3/4 D) All of them

7. In a cross between a heterozygous tall plant (**Tt**) and a short plant (**tt**), what percentage of offspring will be short? A) 0% B) 25% C) 50% D) 100%

8. A cross between a homozygous dominant (BB) and a homozygous recessive (bb) will produce offspring that are all: A) BB B) Bb C) bb D) A mix of BB and bb

9. A test cross is used to determine whether an organism showing the dominant phenotype is: A) Male or female B) Homozygous dominant or heterozygous C) Alive or dead D) Haploid or diploid

10. The Law of Segregation states that: A) Genes on different chromosomes sort independently B) Each parent passes on only one allele for each gene to each offspring C) Dominant alleles are always expressed D) All offspring are identical to the parents

Extensions to Mendelian Genetics

11. When a cross between red flowers and white flowers produces ALL pink flowers, this is an example of: A) Complete dominance B) Codominance C) Incomplete dominance D) Sex-linked inheritance

12. If two pink flowers (**RW** × **RW**) are crossed, the phenotypic ratio of offspring will be: A) All pink B) 1 Red : 2 Pink : 1 White C) 3 Red : 1 White D) 1 Red : 1 White

13. Human blood type AB (genotype I^A I^B) is an example of: A) Incomplete dominance B) Codominance C) Simple dominance D) Polygenic inheritance

14. Traits like human height and skin color, which are controlled by many genes, demonstrate: A) Simple dominance B) Codominance C) Polygenic inheritance D) Sex-linked inheritance

Sex Linkage & Pedigrees

15. Traits controlled by genes located on the X chromosome are called: A) Autosomal traits B) Sex-linked (X-linked) traits C) Polygenic traits D) Codominant traits

16. X-linked recessive disorders (like color blindness) are more common in males because: A) Males have two X chromosomes B) Males have only one X chromosome, so one recessive

allele is enough to express the trait C) The Y chromosome carries the allele for color blindness D) Females cannot be color blind

17. A chart that tracks a genetic trait across multiple generations in a family is called a: A) Karyotype B) Punnett square C) Pedigree D) Genetic map

18. A carrier woman for color blindness (**X^C X^c**) has children with a man with normal vision (**X^C Y**). What is the probability that their sons will be color blind? A) 0% B) 25% C) 50% D) 100%

Part B: Fill in the Blank

19. The allele that is expressed in the heterozygote is called ___, while the allele that is hidden (masked) is called ___.

20. The physical appearance of an organism is its ___, and its genetic makeup is its ___.

21. A cross involving two different traits at once (e.g., **AaBb × AaBb**) is called a ___ cross.

22. Human biological sex is determined by the ___ chromosomes. Females are _ ***and males are*** _.

23. In a pedigree chart, a filled-in circle represents a(n) ___, and a filled-in square represents a(n) ___.

Part C: Short Answer

24. Set up a Punnett square for a cross between two heterozygous parents (**Aa × Aa**). State the genotypic ratio and the phenotypic ratio.

25. Explain the difference between incomplete dominance and codominance. Give one real-world example of each.

26. A father who is color blind (**X^c Y**) and a mother who is a carrier (**X^C X^c**) have children. Set up the Punnett square and determine the probability that their daughters will be color blind.

27. Define the following genetics vocabulary terms: allele, genotype, phenotype, dominant, recessive.

End of Practice Test 06