PRACTICE TEST
Chapter 9 Patterns of Inheritance

Multiple-Choice Questions

1) Which of the following statements regarding genotypes and phenotypes is *false*?
A) The genetic makeup of an organism constitutes its genotype.
B) An organism with two different alleles for a single trait is said to be homozygous for that trait.
C) Alleles are alternate forms of a gene.
D) The expressed physical traits of an organism are called its phenotype.

2) The alleles of a gene are found at _____ chromosomes.
A) the same locus on nonhomologous
B) different loci on homologous
C) different loci on nonhomologous
D) the same locus on homologous
Answer: D

3) If *A* is dominant to *a* and *B* is dominant to *b*, what is the expected phenotypic ratio of the cross *AaBb* × *AaBb*?
A) 16:0:0:0
B) 8:4:2:2
C) 1:1:1:1
D) 9:3:3:1

4) Mendel's law of independent assortment states that
A) chromosomes sort independently of each other during mitosis and meiosis.
B) independent sorting of genes produces polyploid plants under some circumstances.
C) each pair of alleles segregates independently of the other pairs of alleles during gamete formation.
D) genes are sorted concurrently during gamete formation.

5) A testcross is
A) a mating between an individual of unknown genotype and an individual homozygous recessive for the trait of interest.
B) a mating between an individual of unknown genotype and an individual heterozygous for the trait of interest.
C) a mating between two individuals heterozygous for the trait of interest.
D) a mating between two individuals of unknown genotype.

6) A carrier of a genetic disorder who does not show symptoms is most likely to be _____ to transmit it to offspring.
A) heterozygous for the trait and able
B) heterozygous for the trait and unable
C) homozygous for the trait and able
D) homozygous for the trait and unable

7) All the offspring of a cross between a red-flowered plant and a white-flowered plant have pink flowers. This means that the allele for red flowers is _____ to the allele for white flowers.
A) dominant
B) codominant
C) incompletely dominant
D) recessive

8) Which of the following is an example of incomplete dominance in humans?
A) albinism
B) hypercholesterolemia
C) skin color
D) ABO blood groups

9) The expression of both alleles for a trait in a heterozygous individual illustrates
A) incomplete dominance.
B) codominance.
C) pleiotropy.
D) polygenic inheritance.

10) A person with AB blood illustrates the principle of
A) incomplete dominance.
B) codominance.
C) pleiotropy.
D) polygenic inheritance.

11) Which of the following terms refers to a situation where a single phenotypic character is determined by the additive effects of two or more genes?
A) incomplete dominance
B) codominance
C) pleiotropy
D) polygenic inheritance

12) Which of the following is essentially the opposite of pleiotropy?
A) incomplete dominance
B) codominance
C) multiple alleles
D) polygenic inheritance

13) A colorblind woman marries a man who is not colorblind. All of their sons, but none of their daughters, are colorblind. Which of the following statements correctly explains these results?
A) The gene for color vision is incompletely dominant to the gene for sex determination.
B) The gene for color vision is codominant with the gene for sex determination.
C) The gene for color vision is found on the X chromosome.
D) The gene for color vision is found on the Y chromosome.

14) Sex-linked conditions are more common in men than in women because
A) men acquire two copies of the defective gene during fertilization.
B) men need to inherit only one copy of the recessive allele for the condition to be fully expressed.
C) the sex chromosomes are more active in men than in women.
D) the genes associated with the sex-linked conditions are linked to the Y chromosome, which determines maleness.

15) In giraffes, long necks (*N*), long legs (*L*), dark spots (*D*), and the ability to digest meat (*M*) are all dominant traits. What possible genotype could a long-necked, short-legged, light-spotted, meat-digesting giraffe have?
A) *NnlldMM*
B) *NNLLDdMm*
C) *NNlldmm*
D) *nnLLddMM*

16) Name all possible gametes for each parent given:
A. RRGg
B. TtSs
C. Rr
D. BrTtGg

Show Your Work!!

1. In pea plants yellow seeds are dominant to green seeds. What genotypic and phenotypic ratios would you expect in the offspring from a cross between a homozygous green and a heterozygpeous yellow?

2. If all offspring of a particular cross have the genotype Aa, what must the genotype of each parent be?

3. A breeder has a black male poodle and wants to know if he is a pure bred so he performs a test cross. If all offspring produced are black what would the genotype of the poodle be? Is the poodle a pure bred?

4**.** When red parrots mate with yellow parrots their offspring are orange (a blend). What would be the genotypes and phenotypes possible in the offspring of two orange parrots and in what ratios?

5. In guinea pigs, rough (rossetted) coat is due to a dominant gene, R, smooth to its recessive allele, r. Black is due to a dominant gene, B, white to its recessive allele, b. What genotypes and phenotypes are possible in a cross between a heterozygous rough black guinea pig and a homozygous smooth black guinea pig?

6. If straight hair is incompletely dominant to curly, and wavy hair is an intermediate trait - Susan has straight hair and has a child with Monty who has wavy hair, what is the chance their child would have wavy hair?

7. If Sam has type O blood and Sarah has type AB blood what is the chance their child could have type O blood? Type A blood? Type AB blood?

8. If Alex has type A blood and Rowanda has type B blood and their child has type AB blood, what are the possible genotypes of Alex and Rowanda?

9. Hemophilia in humans is due to a recessive X-chromosome mutation. What will be the results of mating between a normal (non-carrier) female and a hemophiliac male?

10. A girl with red-green color blindness has a mother with normal vison. What would the mothers and fathers genotype have to be?

After reading the paragraph below, answer the questions that follow.

A man and his wife are having trouble having a baby. Using modern technologies, the woman's eggs are removed, fertilized with her husband's sperm, and implanted into her uterus. The procedure is successful, and the woman gives birth to a healthy baby boy. After a while, though, they discover that their son is colorblind and has blood type O. The woman claims that the child can't be theirs since she has blood type A and her husband has type B. Also, neither parent is colorblind, although one grandparent (the woman's father) is also colorblind.

1) As a genetic counselor, you would explain to the parents that
A) the eggs must have been accidentally switched, since the baby's blood type has to match one of his parents.
B) each parent could have contributed one recessive allele, resulting in type O blood.
C) the eggs must have been accidentally switched, since a type A parent and a type B parent can have any type children except O.
D) it is possible for the baby to have type O blood, since type O is inherited through a dominant allele.

2) In regard to the baby's colorblindness, a sex-linked recessive trait, you explain that
A) colorblindness often appears randomly, even if neither parent is colorblind.
B) the baby's father must have a recessive allele for colorblindness.
C) since colorblindness is sex-linked, a son can inherit colorblindness if his mother has the recessive colorblindness allele.
D) the eggs must have been accidentally switched, since males inherit sex-linked traits only from their fathers.