BIO 100 UNIT 6 PRACTICE TEST

Answer the following questions on a separate sheet of paper.

1. In pea plants, the allele for purple flowers \((P)\) is dominant over the allele \((p)\) for white flowers. In a cross between a purple-flowered plant and a white-flowered plant, all 152 of the offspring plants had purple flowers. Which of the following most likely describes the cross above?

a. \(pp \times pp\)
b. \(Pp \times Pp\)
c. \(PP \times pp\)
d. \(PP \times PP\)

2. Which of the following is an example of a qualitative trait?

a. human height
b. human skin color
c. Huntington's disease
d. eye color

3. Which of the following is a true statement about chromosome number?

a. Among all known living creatures, humans have the most chromosomes.
b. Animals have more chromosomes than plants.
c. Eukaryotes have more chromosomes than prokaryotes.
d. Larger organisms always have larger numbers of chromosomes.

4. Dizygotic twins are the result of:

a. one embryo splitting to become two embryos.
b. two eggs each being fertilized by two different sperm.
c. one sperm fertilizing two different eggs.
d. one egg being fertilized by two different sperm.

5. Congenital night blindness is caused by a dominant autosomal allele \((B)\). The night blindness allele \((B)\) is completely dominant over the normal allele \((b)\). Suppose a man is homozygous for this trait and his wife is normal. What is the probability for their children having the trait?

a. 0%
b. 25%
c. 50%
d. 100%

6. ________ twins, or identical twins, have identical sets of chromosomes.

a. dizygotic
b. monozygotic
c. heterozygotic
d. homozygotic
7. Which of the following groups would you expect to have the lowest variance when it comes to height?

a. a group of jockeys  
b. all of the students on the Pima Downtown Campus  
c. all of the students who use the Biology Learning Center  
d. a group of spectators at a baseball game

8. A ________ trait (for example, height or skin color) shows continuous variation.

a. quantitative  
b. qualitative  
c. artificial  
d. natural

9. Ignoring crossing over, segregation of alleles occurs when:

a. homologous chromosomes separate during meiosis.  
b. homologous chromosomes separate during mitosis.  
c. sister chromatids separate during meiosis.  
d. sister chromatids separate during mitosis.

10. If the DNA contained in the chromosomes of an organism are similar to an instruction manual, then what are the genes "instructing" the cell to do?

a. grow in size until a certain point is reached, then reproduce itself  
b. convert carbohydrates into enzymes  
c. change shape and structure to meet the demands of the local environment  
d. synthesize specific proteins from amino acids

11. A dominant genetic disorder, such as Huntington’s disease, can occur in which of the following?

a. a homozygous recessive genotype only.  
b. a homozygous dominant genotype only.  
c. a heterozygous genotype only.  
d. a homozygous dominant genotype and a heterozygous genotype.

12. Cystic fibrosis is caused by the allele “f”, which is completely recessive to the normal dominant allele “F”. Consider a couple in which both the man and woman have the genotype “Ff”. What is the chance that their first child will develop cystic fibrosis?

a. 25%  
b. 50%  
c. 75%  
d. 100%

13. Cystic fibrosis is caused by the allele “f”, which is completely recessive to the normal dominant allele “F”. Consider a couple in which both the man and woman have the genotype “Ff”. What is the chance that their SECOND child will develop cystic fibrosis?
14. Both a man and a woman are heterozygous for freckles. Freckles (F) are completely dominant over no freckles (f). What is the chance that their child will have freckles?

a. 25%
b. 50%
c. 75%
d. 100%

15. Combined, your parents could have produced as many as ________ different types of children, genetically speaking.

a. 8 million
b. 46
c. 285
d. 64 trillion

16. A recessive genetic disorder, such as cystic fibrosis, only occurs when an individual has:

a. one copy of the mutant allele.
b. two copies of the mutant allele.
c. a heterozygous genotype.
d. a homozygous dominant genotype.

17. Which of the following is an example of a quantitative trait?

a. human height
b. cystic fibrosis
c. Huntington's disease
d. flower color in Mendel’s pea plants

18. A polygenic trait:

a. can only be caused by recessive alleles.
b. is determined by two or more genes.
c. is the result of cross-fertilization.
d. is the result of self-fertilization.

19. Which if the following is the correct sequence of how an animal is "built"?

a. fertilization → meiosis → zygote → embryo
b. meiosis → fertilization → zygote → embryo
c. fertilization → zygote → meiosis → embryo
d. meiosis → fertilization → embryo → zygote
20. Half of the gametes produced by an organism with the genotype \( Aa \) will receive the \( A \) allele, while half will receive the \( a \) allele. This is a demonstration of:

a. mutation and new allele formation  
b. random fertilization and differentiation  
c. segregation and independent assortment.  
d. mitosis and differentiation  

21. The bell-shaped curve is used to depict the ________ of a/an ________ trait.

a. normal distribution; qualitative  
b. normal distribution; quantitative  
c. prediction of heritability; polygenic  
d. frequency distribution; intelligence-determining  

22. Which of the following is a result of crossing over during meiosis?

a. Chromosomes with new combinations of alleles are created.  
b. Dominant alleles tend to be inherited together.  
c. Gametes contain much less than one half of the genetic information of the parent that produced them.  
d. Gametes contain much more than one half of the genetic information of the parent that produced them.  

23. When a dominant allele has different effects between heterozygous individuals and homozygous individuals, the phenomenon is called:

a. continuous variation.  
b. complete dominance.  
c. polygenic inheritance.  
d. incomplete dominance.  

24. A mutation in a gene:

a. might have no effect on the protein encoded by the gene.  
b. must result in the creation of a nonfunctional protein.  
c. can't result in a protein with a new function.  
d. invariably results in a change in the phenotype of an organism.
25. Hair color is produced by several different genes. It is still not clear exactly how many are involved, but we will assume that 4 genes are involved (e.g., AABBCCDD produces black hair, AABbCcdd produces light brown hair, aaBbccdd produces very light blonde hair). Thus, hair color is based on the number of dominant alleles:

8 dominant alleles = black
7 dominant alleles = very dark brown
6 dominant alleles = dark brown
5 dominant alleles = brown
4 dominant alleles = light brown
3 dominant alleles = brown mixed with blonde
2 dominant alleles = blonde
1 dominant allele = very light blonde
0 dominant alleles = almost white

What would be the hair color for the genotype AaBaCcdd?

a. very dark brown
b. brown
c. blond
d. brown mixed with blonde

Answers:
1. c
2. c
3. c
4. b
5. d
6. b
7. a
8. a
9. a
10. d
11. d
12. a
13. a
14. c
15. d
16. b
17. a
18. b
19. b
20. c
21. b
22. a
23. d
24. a
25. d