Biology Chapter 13 Test: Genetics and Biotechnology

True/False
Indicate whether the statement is true or false.

1. In the electrophoresis gel shown in Figure 13-1, the DNA located in the band labeled C is longer than the DNA located in the band labeled A.

2. Gene expression profiles between normal cells and cancer cells can be compared using microarray technology.

3. The human genome is made up of 32 chromosomes.

4. Microarray analysis of gene expression in a cell involves extracting the proteins from that cell.

5. PCR is often used in forensic (crime-related) identification work because the samples found are usually contaminated.

6. DNA fingerprinting can be used to identify the father of a child, but not the mother.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

7. In pea plants, inflated pods \((R)\) are dominant to constricted pods \((r)\). Which of the following is a cross between inflated pods and constricted pods?
   a. \(RR \times RR\)             c. \(RR \times rr\)
   b. \(RR \times Rr\)           d. \(Rr \times Rr\)
8. What is the genotype of the unknown rabbit in Figure 13-3?
   a. homozygous long ears  
   b. homozygous short ears  
   c. heterozygous  
   d. recessive

9. What would be the result of the test cross in Figure 13-3 if the unknown were homozygous long ears?
   a. 1/2 of the offspring would have long ears  
   b. all of the offspring would have long ears  
   c. all of the offspring would have short ears  
   d. 1/4 of the offspring would have short ears

10. What must be on either end of any genetic material that is inserted into the cleaved DNA in Figure 13-4?
   a. 5'AATT3'  
   b. 5'ATAT3'  
   c. 5'CCGG3'  
   d. 5'CGCG3'
11. According to Figure 13-6, which are the parents of the child?
   a. A  c. C
   b. B  d. D

12. What genotypes are produced by a program of inbreeding?
   a. only recessive homozygous
   b. only dominant homozygous
   c. only heterozygous
   d. only homozygous

13. The offspring of the cross-fertilization of pea plants with purple flowers and pea plants with white flowers are called
   a. gametes.
   b. hybrids.
   c. pure breeds.
   d. recessive breeds.

14. The process by which plants are bred to produce larger fruits and a longer growing time is called
   a. dominant breeding.
   b. offspring breeding.
   c. recessive breeding.
   d. selective breeding.

15. What is the name used to describe a cross between two varieties of a plant used in an attempt to create a new variety with traits from both parents?
   a. cloning
   b. hybridization
   c. polyploid planting
   d. selective breeding

16. What is the name of the method whereby developing pure lines, breeders preserve desirable traits?
   a. hybridization
   b. inbreeding
   c. cross pollination
   d. mass selection

17. What is the purpose of producing a line by inbreeding?
   a. reducing the number of genes
   b. reducing dominant traits
   c. eliminating recessive traits
   d. eliminating hidden variation

18. In a test cross, if one parent’s genotype is homozygous dominant, all of the offspring will have the dominant phenotype.
   a. all of the offspring will have the dominant phenotype.
   b. 3/4 of the offspring will have the dominant phenotype.
   c. 1/2 of the offspring will have the dominant phenotype.
   d. 1/4 of the offspring will have the dominant phenotype.

19. A DNA molecule containing regions from different sources is called
   a. DNA ligase.
   b. recombinant DNA.
   c. restriction DNA.
   d. template DNA.
20. In which of these processes do scientists use restriction enzymes?
   a. genetic engineering  
   b. hybridization  
   c. inbreeding  
   d. selective breeding

21. What is the term used to describe the complete genetic information of a cell or organism?
   a. clone  
   b. genome  
   c. haplotype  
   d. nucleotide

22. The regions of DNA that are unique to each individual are the
   a. nucleotide regions.  
   b. phosphate regions.  
   c. non-coding regions.  
   d. protein-coding regions.

23. Regions of linked variations in the genome that can be associated with human diseases are known as
   a. haplotypes.  
   b. plasmids.  
   c. coding regions.  
   d. non-coding regions.

24. Santa Gertrudis cattle were developed by mating shorthorn beef cattle, who produce high-quality beef, with heat- and insect-resistant Brahman cattle from India. The result of this cross are cattle that are resistant to heat and insects and also produce high-quality beef. This process is an example of
   a. cloning.  
   b. genetic engineering.  
   c. hybridization.  
   d. inbreeding.

25. A genetically engineered organism that contains a gene from another organism is called a
   a. bacterial organism.  
   b. cloned organism.  
   c. genetic organism.  
   d. transgenic organism.