

## Chapter 2. Basic Genetics

### Multiple Choice

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

- \_\_\_ 1. When 1,000 donors were tested, 75% were positive for C and 25% were negative for C; the gene frequency of C is:
- a. 10.
  - b. 1.
  - c. 0.5.
  - d. 25.
- \_\_\_ 2. All of the following may cause an alteration in DNA, *except*:
- a. ultraviolet light.
  - b. alkylating agents.
  - c. antibodies.
  - d. enzymes.
- \_\_\_ 3. How is it genetically possible for a child to type Rh-negative?
- a. Both parents are Dd.
  - b. Both parents are DD.
  - c. Mom is DD and Dad is Dd.
  - d. Sibling is Rh-positive.
- \_\_\_ 4. All of the following are included in transcription *except*:
- a. mRNA terminates at the 5' end.
  - b. RNA polymerase II binds to a promoter.
  - c. it proceeds from the 3' end to the 5' end.
  - d. the 5' end is capped with a methyl residue.
- \_\_\_ 5. Which of the following best describes the structure of human chromosomes?
- a. Linear strands of DNA wound around histones
  - b. Linear strands of RNA wrapped around histones
  - c. Tertiary structure of DNA wound around histones
  - d. Quaternary structure of DNA wound around histones
- \_\_\_ 6. In Mendel's law of separation, the first-filial generation is:
- a. recessive.
  - b. homozygous.
  - c. heterozygous.
  - d. autologous.
- \_\_\_ 7. A father carries the Xg<sup>a</sup> trait and passes it on to all of his daughters but none of his sons. What type of inheritance does this represent?
- a. Autosomal dominant
  - b. X-linked dominant
  - c. X-linked recessive
  - d. Autosomal recessive
- \_\_\_ 8. Methods to isolate intact DNA in order for it to be studied include all of the following *except*:
- a. pH changes.
  - b. enzyme activation.
  - c. detergent lysis.
  - d. heat treatment.
- \_\_\_ 9. Point mutations include which of the following?
- a. Substitutions
  - b. Insertions
  - c. Deletions
  - d. Substitutions, insertions, and deletions
- \_\_\_ 10. Which of the following best describes the process of mitosis?
- a. Cell division by which only one-half of the daughter cells produced are identical to the parent cell

- b. Cell division of germ cells by which two successive divisions of the nucleus produce cells that contain half the number of chromosomes of somatic cells
  - c. Cell division that produces two daughter cells having the same number of chromosomes as the parent
  - d. Cell division that produces four daughter cells (4n)
- \_\_\_ 11. All of the following processes occur in replication, *except*:
- a. the two DNA strands separate via helicase.
  - b. DNA polymerase acts on the 5' to 3' parent strand to produce an anticomplementary duplicate strand.
  - c. DNA polymerase acts on the 3' to 5' parent strand to produce an anticomplementary duplicate strand.
  - d. replication of the 3' to 5' parent strand is initiated by the enzyme primase, which anneals to the parent strand.
- \_\_\_ 12. Which type of genetic change (mutation) is incapable of reverting back to the original phenotype?
- a. Duplication
  - b. Deletion
  - c. Recombination
  - d. Insertion
- \_\_\_ 13. In the MN blood group system, a person who inherits an "M" allele and an "N" allele expresses both M and N antigens on the RBCs. Which of the following is true?
- a. M is dominant to N.
  - b. N is dominant to M.
  - c. M and N are codominant alleles.
  - d. M and N are located on the same chromosome.
- \_\_\_ 14. A gene, such as the *O* gene, that produces no detectable product is called:
- a. an amorph.
  - b. a trait.
  - c. an allele.
  - d. recessive.
- \_\_\_ 15. What blood group is the best example of codominantly inherited blood group genes?
- a. Rh
  - b. MN
  - c. Lewis
  - d. ABO
- \_\_\_ 16. When an individual is said to have blood group A, it refers to the individual's:
- a. alleles on the chromosome.
  - b. genotype.
  - c. phenotype.
  - d. haplotype.
- \_\_\_ 17. The two strands of DNA are: \_\_\_\_\_; one runs in a 5' to 3' direction, and the other runs in a 3' to 5' direction.
- a. parallel
  - b. antiparallel
  - c. somatic
  - d. zigzag
- \_\_\_ 18. In what stage of mitosis is DNA *not* actively dividing?
- a. Interphase
  - b. Prophase
  - c. Metaphase
  - d. Anaphase
- \_\_\_ 19. How many chromosomes do somatic cells of humans have?
- a. 46
  - b. 50
  - c. 23
  - d. 100
- \_\_\_ 20. The diploid chromosome number in humans is:
- a. 12
  - c. 46



- \_\_\_\_\_ 32. A woman with blood group A marries a man with blood group O. Their firstborn child has blood group O. The mother's most probable genotype is:
- a. OO
  - b. AA
  - c. AB
  - d. AO
- \_\_\_\_\_ 33. A structural alteration of DNA in an organism that is caused by a physical or chemical agent is called:
- a. transcription.
  - b. translation.
  - c. mutation.
  - d. cloning.
- \_\_\_\_\_ 34. In a pedigree analysis, what do vertical lines indicate?
- a. Consanguineous mating
  - b. Offspring
  - c. Stillbirth
  - d. Deceased sibling
- \_\_\_\_\_ 35. What is a vector?
- a. Substance capable of catalyzing a reaction
  - b. Sequence of three bases in a strand of DNA
  - c. Extrachromosomal genetic element that can carry a recombinant DNA molecule into a host bacterial cell
  - d. Substance that can carry an electric current in solution
- \_\_\_\_\_ 36. Which of the following must be true when using the Hardy-Weinberg equation?
- a. The population must be large
  - b. Mutations cannot occur
  - c. Mating must occur randomly
  - d. All of the above
- \_\_\_\_\_ 37. Alternate forms of a gene that can occur at a single chromosome locus are referred to as:
- a. amorphs.
  - b. traits.
  - c. alleles.
  - d. recessive.
- \_\_\_\_\_ 38. The condition in which one chromosome has a copy of the gene and the other chromosome has that gene deleted or absent is referred to as:
- a. homozygous.
  - b. heterozygous.
  - c. hemizygous.
  - d. recessive.
- \_\_\_\_\_ 39. Most antigens in the various blood group systems follow what kind of inheritance patterns?
- a. Codominant
  - b. Homozygous
  - c. Dominant
  - d. Autosomal
- \_\_\_\_\_ 40. All of the following are consistent with Mendel's basic rules of inheritance *except*:
- a. the gene is transmitted through generations intact.
  - b. a pair of genes is always found in the same gamete.
  - c. different pairs of genes are assorted independently of each other.
  - d. a pair of genes is rarely found in the same gamete.

## Chapter 2. Basic Genetics

### Answer Section

#### MULTIPLE CHOICE

1. ANS: C	PTS: 1	KEY: Taxonomy Level: 3	LO: 2-4
2. ANS: D	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-9
3. ANS: A	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-2
4. ANS: A	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-8
5. ANS: A	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
6. ANS: C	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-1
7. ANS: B	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-2
8. ANS: D	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-11
9. ANS: D	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-9
10. ANS: C	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-6
11. ANS: C	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-8
12. ANS: B	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-9
13. ANS: C	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-2
14. ANS: A	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-2
15. ANS: B	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-2
16. ANS: C	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-2
17. ANS: B	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-8
18. ANS: A	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-6
19. ANS: A	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-7
20. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-7
21. ANS: B	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-3
22. ANS: D	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-3
23. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
24. ANS: A	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-7
25. ANS: B	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
26. ANS: D	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
27. ANS: B	PTS: 1	KEY: Taxonomy Level: 3	LO: 2-4
28. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
29. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
30. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-12
31. ANS: D	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-8
32. ANS: D	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-5
33. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-9
34. ANS: B	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-5
35. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-12
36. ANS: D	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-3
37. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-10
38. ANS: C	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-9
39. ANS: A	PTS: 1	KEY: Taxonomy Level: 1	LO: 2-11
40. ANS: B	PTS: 1	KEY: Taxonomy Level: 2	LO: 2-1