

## Genetics

**Questions 1–25: Select the one best answer to each question.**

1. How does mitosis in plant cells differ from that in animal cells?
  - A. Animal cells don't form a spindle.
  - B. Animal cells lack cytokinesis.
  - C. Plant cells lack a cell plate.
  - D. Plant cells lack centrioles.
2. Polygenic inheritance can explain
  - A. a range of phenotypes among the offspring.
  - B. the occurrence of degrees of dominance.
  - C. incomplete dominance.
  - D. pleiotropy syndrome.
3. Which of these is *true* of meiosis?
  - A.  $n \rightarrow n$
  - B.  $n \rightarrow 2n$
  - C.  $2n \rightarrow n$
  - D.  $2n \rightarrow 2n$
4. The genetic disorder sickle cell disease is an example of
  - A. pleiotropy.
  - B. heterozygous dominance.
  - C. epistasis.
  - D. homozygous dominance.
5. Which one of the following genotypes causes Klinefelter syndrome?
  - A. XY
  - B. XX
  - C. XXY
  - D. XYY
6. The phase of cell division in which the nuclear envelope and nucleolus are disappearing as the spindle fibers are appearing is called
  - A. anaphase.
  - B. prophase.
  - C. telophase.
  - D. metaphase.

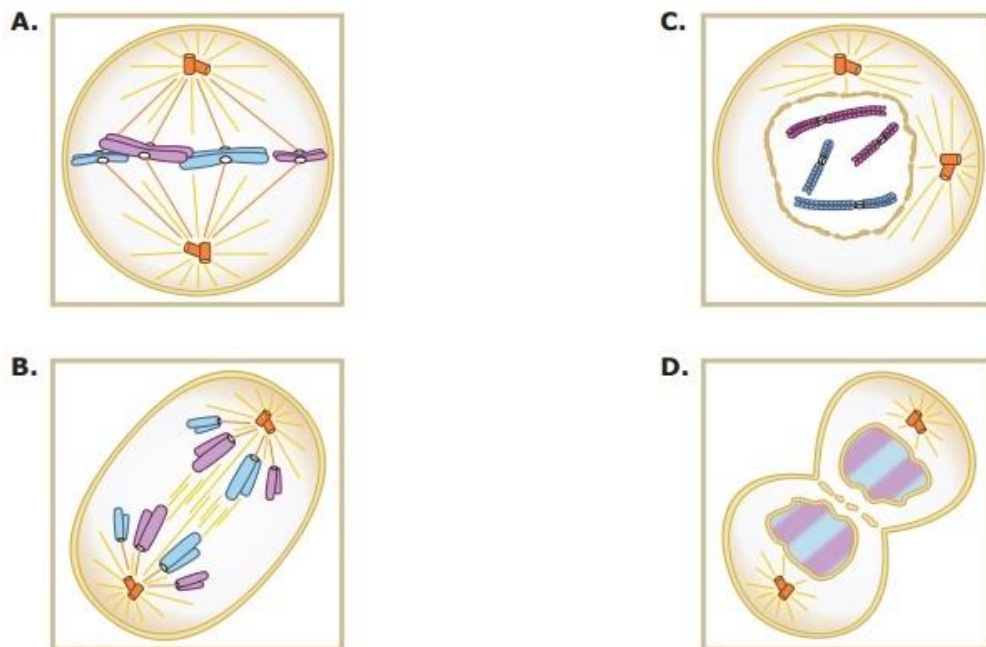
7. Which one of the following phrases *best* describes the human karyotype?
- A. 46 pairs of autosomes
  - B. Sex chromosomes along with 23 pairs of autosomes
  - C. One pair of sex chromosomes and 22 pairs of autosomes
  - D. X and Y chromosomes and 22 pairs of autosomes
8. Autosomes are \_\_\_\_\_ chromosomes.
- A. haploid
  - B. non-sex
  - C. homologous
  - D. abnormal
9. When you notice that someone has unusually blue eyes, you've noticed their
- A. allele.
  - B. hybridization.
  - C. phenotype.
  - D. genotype.
10. Which one of the following statements about mitosis is *correct*?
- A. It's part of the process of oogenesis.
  - B. It forms two daughter cells.
  - C. It creates haploid nuclei.
  - D. It consists of two parts: mitosis I and mitosis II.
11. Which of these is happening when translation takes place?
- A. mRNA is still in the nucleus.
  - B. rRNAs expose their anticodons.
  - C. DNA is being replicated.
  - D. tRNAs are bringing amino acids to the ribosomes.
12. Two organisms, each with the genotypes TtGg, mate. The chance of producing an offspring that has the dominant phenotype for height (T) and the recessive phenotype for color (g) is
- A. 3/16.
  - B. 7/16.
  - C. 9/16.
  - D. 11/16.

13. A parent with type AB blood could *not* produce a child with type
- A.** A.
  - B.** B.
  - C.** AB.
  - D.** O.
14. Which one of the following strands of DNA is the complement strand to C-C-A-T-C-G?
- A.** G-G-T-A-G-C
  - B.** G-G-A-T-G-C
  - C.** A-A-C-G-A-T
  - D.** T-T-G-C-T-A
15. Which chromosomal mutation results in Alagille syndrome?
- A.** Inversion
  - B.** Translocation
  - C.** Duplication
  - D.** Deletion
16. An enhancer affects what level of genetic control?
- A.** Post-transcription
  - B.** Translation
  - C.** Transcription
  - D.** Post-translation
17. A woman who isn't colorblind but has an allele for color blindness reproduces with a man who has normal vision. What is the chance that they'll have a colorblind daughter?
- A.** 50%
  - B.** 25%
  - C.** 100%
  - D.** 0%
18. A recessive allele *t* is responsible for a condition called distonia. A man who has this condition marries a woman who doesn't. One of their four children has the condition. What are the possible genotypes of the man and the woman? (*Hint:* To help you answer this question, create a Punnett square for each possibility.)
- A.** The father is *Tt*; the mother is *TT*.
  - B.** The father is *tt*; the mother is *TT*.
  - C.** Both parents are *TT*.
  - D.** The father is *tt*; the mother is *Tt*.
19. If a piece of DNA breaks off from a chromosome and attaches itself to a nonhomologous chromosome at another location, what type of change has occurred?
- A.** Inversion
  - B.** Duplication
  - C.** Deletion
  - D.** Translocation

20. Which one of the following is a characteristic of cancer cells?

- A. They're usually either nerve cells or cardiac muscle cells.
- B. They result in uncontrolled growth.
- C. They have a specialized structure and function.
- D. They can't travel to other parts of the body.

21. Which one of the following illustrations shows the stage of mitosis during which the chromosomes are the most tightly condensed?



22. From the cross  $Aa \times Aa$ , the probability of producing a homozygous dominant offspring is

- A. 25%.
- B. 50%.
- C. 75%.
- D. 100%.

23. Genomics is

- A. a sequence of mutant genes.
- B. the study of the human genome.
- C. the study of cellular protein structures.
- D. a mechanism used in DNA fingerprinting.

24. Nondisjunction is the

- A. exchange of chromosome pieces.
- B. failure of chromosome pairs to separate completely.
- C. loss of a piece of a chromosome.
- D. repetitive replications of the same piece of a chromosome.

25. If a cell has 18 chromosomes, how many chromosomes would each daughter cell have after mitosis?

- A. 9
- B. 18
- C. 36
- D. The number can't be determined.