

Name _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 1) What does the term *genetics* mean? 1) _____
- 2) A number of genomes have been sequenced in recent years: *Escherichia coli*, *Saccharomyces cerevisiae*, *Caenorhabditis elegans*, *Drosophila melanogaster*, and *Mus musculus*. What are the common names for these organisms? 2) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

- 3) True or False: Bioinformatics is a discipline involved in the development of both hardware and software for processing, storing, and retrieving nucleotide and protein data. 3) _____

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- 4) Organisms that are well understood from a scientific standpoint and are often used in basic biological research are often called _____. 4) _____
- 5) What is the composition of the genetic material? 5) _____
- 6) What term is applied to a variety of projects whereby genome sequences are deposited in databases for research purposes? 6) _____
- 7) Alternative forms of a gene are called _____. 7) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 8) What is the term given to the theory which states that the fertilized egg contains a complete miniature adult? 8) _____
- A) transformation
B) conjugation
C) cell theory
D) preformation
E) transduction

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 9) Name the individual who, while working with the garden pea in the mid-1850s, demonstrated quantitative patterns of heredity and developed a theory involving the behavior of hereditary factors. 9) _____
- 10) Name two individuals who provided the conceptual basis for our present understanding that genes are on chromosomes. 10) _____
- 11) Name the substance that serves as the hereditary material in eukaryotes and prokaryotes. 11) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

12) Who, along with Alfred Wallace, formulated the theory of natural selection?

12) _____

- A) William Harvey
- B) James Watson
- C) Louis Pasteur
- D) Charles Darwin
- E) Gregor Mendel

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13) Early in the twentieth century, Walter Sutton and Theodor Boveri noted that the behavior of chromosomes during meiosis is identical to the behavior of genes during gamete formation. They proposed that genes are carried on chromosomes, which led to the basis of the _____.

13) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

14) True or False: Genetics is the study of heredity and variation.

14) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

15) What term is used to describe the fact that different genes in an organism often provide differences in observable features?

15) _____

16) What is a mutation?

16) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

17) True or False: Complementarity in a genetic sense refers to the polymerization of nucleotides in DNA.

17) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

18) List the two relatively complex processes in which genetic information is converted into functional products.

18) _____

19) *Arabidopsis* is a model organism for the study of _____.

19) _____

20) In nonviral systems, what is the nature of the hereditary substance?

20) _____

21) Until the mid-1940s, many scientists considered proteins to be the likely candidates for the genetic material. Why?

21) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 22) What is the term given to the theory which put forth the idea that living organisms could arise by incubating nonliving components? 22) _____
- A) spontaneous generation
 - B) collective combination
 - C) evolution
 - D) natural selection
 - E) preformation

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 23) What is another term for a biological catalyst? 23) _____
- 24) Research dealing with which human blood disorder was instrumental in linking the genotype to a specific phenotype, and what conclusion was reached? 24) _____
- 25) What is meant by *complementarity* in terms of the structure of DNA? 25) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 26) Who was the Augustinian monk that conducted a decade of experiments on the garden pea, eventually showing that traits are passed from parents to offspring in predictable ways? 26) _____
- A) Alfred Wallace
 - B) Hippocrates
 - C) Francis Crick
 - D) Gregor Mendel
 - E) Aristotle

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 27) The various characteristics of organisms that result from their genetic makeup are collectively referred to as an organism's _____. 27) _____
- 28) In 1996, a cloning experiment produced the sheep named Dolly. Contrary to the more traditional method of cloning by embryo splitting, Dolly was produced by which procedure? 28) _____
- 29) What represents an organism's genome? 29) _____
- 30) What term refers to the similarity between parents and offspring and what term refers to the lack of similarity between parents and offspring? 30) _____
- 31) What is a simple definition of an allele? 31) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 32) In the 1600s, William Harvey studied reproduction and development. What is the term given to the theory which states that an organism develops from the fertilized egg by a succession of developmental events that lead to an adult? 32) _____
- A) sequential pattern formation
 - B) epigenesis
 - C) equational transformation
 - D) preformation
 - E) transduction

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

- 33) Recombinant DNA technology is dependent on a particular class of enzymes, known as _____ which cut DNA at specific nucleotide sequences. 33) _____
- 34) Name the bases in DNA and their pairing specificities. 34) _____
- 35) A fundamental property of DNA's nitrogenous bases that is necessary for the double-stranded nature of its structure is _____. 35) _____
- 36) Reference is often made to *adapter molecules* when describing protein synthesis in that they allow amino acids to associate with nucleic acids. To what class of molecules does this term refer? 36) _____
- 37) Name one of the botanists who, in 1900, rediscovered the work of Gregor Mendel. 37) _____
- 38) Given that DNA is the genetic material in prokaryotes and eukaryotes, what other general structures (macromolecules) and substances made by the cell are associated with the expression of that genetic material? 38) _____
- 39) Distinguish the functions of DNA and RNA in a eukaryote. 39) _____
- 40) What is a transgenic organism? 40) _____
- 41) The human genome sequence was reported in 2003 by two groups, the publicly funded _____ and _____. 41) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 42) In many species, there are two representatives of each chromosome. In such species, the characteristic number of chromosomes is called the _____ number. It is usually symbolized as _____. 42) _____
- A) diploid; n
 - B) haploid; n
 - C) haploid; $2n$
 - D) diploid; $2n$
 - E) None of the answers listed is correct.

43) Genetics is the study of _____.

43) _____

- A) heredity and variation
- B) mutation and recession
- C) diploid and haploid
- D) replication and recombination
- E) transcription and translation

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

44) What is meant by the term *genetic code*?

44) _____

Answer Key

Testname: CH1

- 1) Genetics is a subdiscipline of biology concerned with the study of heredity and variation at the molecular, cellular, developmental, organismal, and populational levels.
- 2) bacterium, yeast, roundworm, fruit fly, mouse
- 3) TRUE
- 4) model organisms
- 5) polymers of nucleotides making up DNA
- 6) bioinformatics
- 7) alleles
- 8) D
- 9) Gregor Mendel
- 10) Walter Sutton and Theodor Boveri
- 11) DNA, or deoxyribonucleic acid
- 12) D
- 13) Chromosome Theory of Inheritance
- 14) TRUE
- 15) phenotype
- 16) A mutation is defined as any charitable change in the DNA sequence.
- 17) FALSE
- 18) transcription and translation
- 19) plants
- 20) DNA (deoxyribonucleic acid) is a double-stranded polymer organized as a double helix.
- 21) Proteins are the most abundant, universally distributed components in cells. They were considered likely candidates because of their great structural and functional diversity.
- 22) A
- 23) enzyme
- 24) The work on sickle-cell anemia was instrumental in showing that a mutant gene produced a mutant protein molecule.
- 25) base pairing of A with T, and G with C
- 26) D
- 27) phenotype
- 28) transfer of genetic material from an adult mammary cell
- 29) An organism's genome can be defined as the complete haploid DNA content of an organism.
- 30) Heredity refers to the similarity between parents and offspring and the similarity of members of the same species. Variation refers to the lack of similarity between parents and offspring and members of the same species.
- 31) An allele is a variant form of a gene.
- 32) B
- 33) restriction enzymes
- 34) adenine:thymine, guanine:cytosine
- 35) complementarity
- 36) tRNA
- 37) Carl Correns, Hugo de Vries, Erich Tschermak
- 38) RNA (messenger, ribosomal, transfer), ribosomes, enzymes, proteins
- 39) DNA is responsible for the storage and replication of genetic information; RNA is involved in the expression of stored genetic information.
- 40) A transgenic organism is an organism produced by biotechnology that involves the transfer of hereditary traits across species.
- 41) Human Genome Project; a private, industry-funded project
- 42) D
- 43) A
- 44) The genetic code consists of a linear series of three adjacent nucleotides present in mRNA molecules.