

Bio12-Q2W4-5- H.W.-Molecular Genetics

Multiple Choice

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

- ____ 1. DNA is composed of nucleotide subunits, each of which contains a —
- a. ribose molecule.
 - b. uracil base.
 - c. phosphate group.
 - d. All of the above

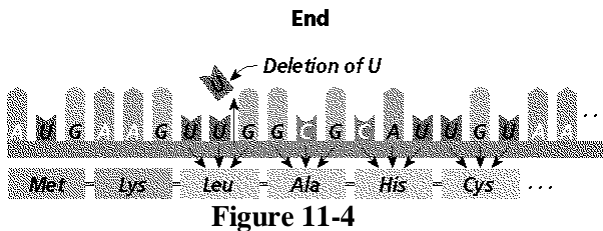
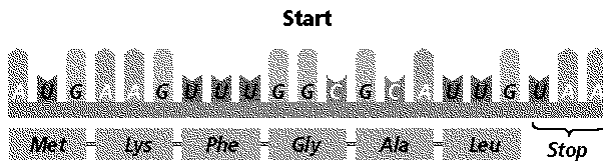
Help Wanted
Positions Available in the genetics industry. Hundreds of entry-level openings for tireless workers. No previous experience necessary. Must be able to transcribe code in a nuclear environment. The ability to work in close association with ribosomes is a must.
Accuracy and Speed vital for this job in the field of translation. Applicants must demonstrate skills in transporting and positioning amino acids. Salary commensurate with experience.
Executive Position available. Must be able to maintain genetic continuity through replication and control cellular activity by regulation of enzyme production. Limited number of openings. All benefits.
Supervisor of production of proteins—all shifts. Must be able to follow exact directions from double-stranded template. Travel from nucleus to the cytoplasm is additional job benefit.

Table 11-1

- ____ 2. Applicants for the second job of the Help Wanted ad in Table 11-1, "Accuracy and Speed," could qualify if they were ____.
- a. tRNA
 - b. DNA
 - c. mRNA
 - d. rRNA
- ____ 3. Applicants for the third job of the Help Wanted ad in Table 11-1, "Executive Position," could qualify if they were ____.
- a. rRNA
 - b. mRNA
 - c. tRNA
 - d. DNA
- ____ 4. Applicants for the fourth job of the Help Wanted ad in Table 11-1, "Supervisor," could qualify if they were ____.
- a. tRNA
 - b. DNA
 - c. mRNA
 - d. rRNA
- ____ 5. Ribosomes are made of ____.
- a. rRNA and protein
 - b. rRNA and mRNA
 - c. tRNA and mRNA
 - d. protein and tRNA
- ____ 6. A mutation is any mistake or change in the
- a. ribosomes.
 - b. DNA sequence.
 - c. nucleus.
 - d. cell.
- ____ 7. The process by which a DNA molecule is copied is called ____.
- a. mitosis
 - b. binary fission
 - c. replication
 - d. translation

- _____ 8. A DNA segment is changed from -AATTAG- to -AAATAG-. This is a _____.
a. inversion c. point mutation
b. deletion d. frameshift mutation
- _____ 9. X rays, ultraviolet light, and radioactive substances that can change the chemical nature of DNA are classified as _____.
a. mutagens c. growth regulators
b. hydrolytic enzymes d. metamorphic molecules
- _____ 10. The chromosome abnormality that occurs when part of one chromosome breaks off and is added to a different chromosome is _____.
a. deletion c. translocation
b. inversion d. nondisjunction

Figure 11-1



- ___ 17. What type of mutation has occurred in Figure 11-4?
 - a. point mutation
 - b. frame shift
 - c. lethal
 - d. protein
- ___ 18. What will be the result of the mutation in Figure 11-4?
 - a. it will have no affect on protein function
 - b. only one amino acid will change
 - c. nearly every amino acid in the protein will be changed
 - d. the organism will die
- ___ 19. Which of the following do DNA and RNA have in common?
 - a. Both contain thymine.
 - b. Both contain phosphate groups.
 - c. Both contain ribose molecules.
 - d. Both are double-stranded.
- ___ 20. An agent that can cause a change in DNA is called a(n)
 - a. inversion.
 - b. mutagen.
 - c. mutation.
 - d. zygote.
- ___ 21. Translation is the process of synthesizing protein from RNA. Which of the following molecules transports amino acids from the cytoplasm to the ribosome for translation?
 - a. tRNA
 - b. mRNA
 - c. rRNA
 - d. All of the above
- ___ 22. A mutation in which a single base is added to or deleted from DNA is called
 - a. nondisjunction.
 - b. a frame shift mutation.
 - c. a point mutation.
 - d. translocation.
- ___ 23. Few chromosome mutations are passed on to the next generation because
 - a. the mature organism is often incapable of producing offspring.
 - b. the mature organism is sterile.
 - c. the zygote usually dies.
 - d. all of the above.
- ___ 24. Mutations in body cells can sometimes result in
 - a. sterile offspring.
 - b. cancer.
 - c. hybrids.
 - d. new species.
- ___ 25. There are 64 different mRNA codons in the genetic code. How many possible codons would there be if a codon consisted of only two nucleotides?
 - a. 16
 - b. 64
 - c. 32
 - d. 8

- ____ 26. An RNA molecule is a polymer composed of subunits known as ____.
- ribose molecules
 - nucleotides
 - polysaccharides
 - uracil molecules
- ____ 27. Mutations that occur at random are called
- nonspontaneous mutations.
 - nonrandom mutations.
 - spontaneous mutations.
 - environmental mutations.

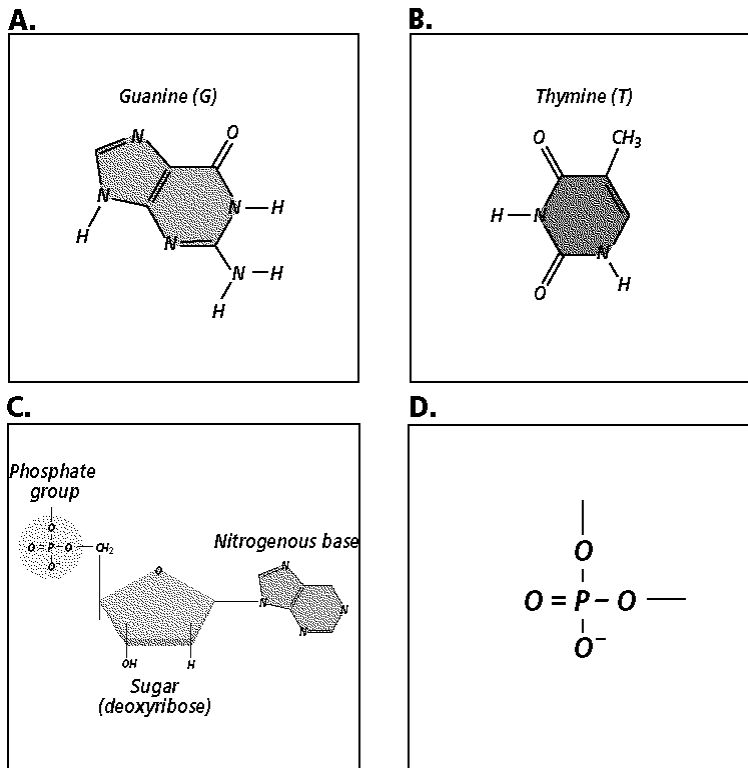


Figure 11-3

- ____ 28. Which structure shown in Figure 11-3 is a pyrimidine?
- D
 - C
 - A
 - B
- ____ 29. Which structure shown in Figure 11-3 would attract a free cytosine nucleotide?
- D
 - A
 - B
 - C
- ____ 30. Which structure shown in Figure 11-3 does not contain a nitrogenous base?
- C
 - B
 - D
 - A
- ____ 31. In most organisms, the start of translation is signaled by an AUG codon. What is the first amino acid in most proteins?
- Leucine
 - Methionine
 - Isoleucine
 - Proline
- ____ 32. Which one of the following nucleotide pair bonds would be found in a DNA molecule?
- adenine-guanine
 - cytosine-uracil
 - adenine-cytosine
 - guanine-cytosine

- ____ 33. The two strands of DNA in the double helix structure are held together by which of the following interactions?
- Ionic bonds
 - Hydrogen bonds
 - Van der Waals forces
 - Covalent bonds
- ____ 34. Which series is arranged in order from largest to smallest in size?
- cell, nucleotide, nucleus, DNA, chromosome
 - cell, nucleus, chromosome, DNA, nucleotide
 - chromosome, nucleus, cell, DNA, nucleotide
 - nucleotide, chromosome, cell, DNA, nucleus
- ____ 35. Chromosomal mutations are especially common in
- humans.
 - bacteria.
 - plants.
 - animals.
- ____ 36. When part of one chromosome breaks off and is added to a different chromosome, the result is a(n)
- inversion.
 - translocation.
 - insertion.
 - deletion.
- ____ 37. The pairing of _____ in DNA is the key feature that allows DNA to be copied.
- nucleotides
 - codons
 - nitrogen bases
 - chromosomes
- ____ 38. The failure of homologous chromosomes to separate properly is called
- nondisjunction.
 - disjunction.
 - translocation.
 - deletion.
- ____ 39. The backbone of a DNA molecule is made of which two components?
- deoxyphosphate molecules and deoxyribose sugars
 - phosphate molecules and ribose sugars
 - phosphate molecules and deoxyribose sugars
 - deoxyphosphate molecules and ribose sugars
- ____ 40. A DNA segment is changed from -AATTAGAAATAG- to -ATTAGAAATAG-. This is a ____.
- inversion
 - frameshift mutation
 - point mutation
 - translation
- ____ 41. Watson and Crick were the first to suggest that DNA is ____.
- a protein molecule
 - the shape of a double helix
 - the genetic material
 - a short molecule
- ____ 42. A DNA nucleotide may be made up of a phosphate group, along with ____.
- ribose sugar and adenine
 - ribose sugar and cytosine
 - deoxyribose sugar and thymine
 - deoxyribose sugar and uracil
- ____ 43. A point mutation is a change in
- several bases in tRNA.
 - several bases in mRNA.
 - several base pairs in DNA.
 - a single base pair in DNA.
- ____ 44. Many chromosome mutations result when chromosomes fail to separate properly during
- mitosis.
 - meiosis.
 - crossing over.
 - linkage.
- ____ 45. Some mutagens, such as the sun's UV radiation, cause mutations in somatic cells, such as dermal cells. Which of the following is NOT likely to occur as a result of such a mutation?
- Exposed skin cells may function improperly.
 - Skin cancer may develop in the offspring of the exposed individual.
 - Skin cancer may develop in the exposed individual.
 - All of the above consequences are likely.

Completion

Complete each statement.

- A. transcription
 - B. translation
 - C. point mutation
 - D. chromosomal mutation
 - E. frameshift mutation
 - F. replication
46. The process of _____ produces a new copy of an organism's genetic information, which is passed on to a new cell.
47. The process of transcription is similar to the process of DNA _____.
48. The process of making RNA from DNA is called _____.
49. The process of converting RNA code into an amino acid sequence is called _____.
50. The process by which DNA makes a copy of itself is called _____.
51. A change in a single base pair of the DNA molecule that affects the synthesis of an entire protein is called a(n) _____.
52. When parts of chromosomes are broken off and lost during mitosis or meiosis, the result is a(n) _____.
53. A(n) _____ involves the addition or deletion of a single base in a DNA molecule.
54. If a nucleotide is added or removed from a DNA molecule and mRNA is created, the codons after the mutation will not be read correctly. This is a _____.
- A. amino acids
 - B. Protein
 - C. nitrogen bases
 - D. ribosomes
 - E. nucleus
55. Proteins are made in the cytoplasm of a cell, whereas DNA is found only in the _____.
56. Proteins are made up of _____.
57. There are twenty different types of _____.
58. Thymine, adenine, guanine, and cytosine are classified as _____.
59. mRNA carries the information for making proteins to the _____.
60. The genetic code is said to be universal because a codon represents the same _____ in almost all organisms.
61. The message of the DNA code is information for building _____.

- A. Tryptophan and methionine
- B. cytosine
- C. Adenine
- D. messenger RNA
- E. tRNA
- F. mRNA _

62. _____, guanine (G), cytosine (C), and thymine (T) are the four nitrogen bases in DNA.
63. In DNA, _____ always forms hydrogen bonds with guanine (G).
64. _____ are amino acids that are each represented by only one codon.
65. The molecule _____ brings amino acids to the ribosomes for the assembly of proteins.
66. During the process of transcription, DNA serves as the template for making _____, which leaves the nucleus and travels to the ribosomes.
67. Translation is to protein as transcription is to _____.
68. _____ carries information from the DNA in the nucleus out into the cytoplasm of the cell.
- A. nucleotides
 - B. double helix
 - C. codon
 - D. cytosine
 - E. single stranded
69. DNA is to RNA as double stranded is to _____.
70. Watson and Crick, with the help of Rosalind Franklin, developed _____ model of DNA.
71. There can be more than one _____ for the same amino acid.
72. Each set of three nitrogenous bases that codes for an amino acid is known as a _____.
73. Watson and Crick called the three-dimensional shape of DNA a _____.
74. The double-coiled shape of DNA is called a _____.
75. The sequence of _____ carries the genetic information of an organism.
- A. amino acid
 - B. threonine
 - C. cytosine
 - D. UUU and UUC
 - E. codon
76. Each set of three nitrogen bases representing an amino acid is referred to as a(n) _____.
77. Adenine is to thymine as guanine is to _____.
78. The amino acid _____ is represented by the mRNA codon ACA.
79. _____ are mRNA codons for phenylalanine.
80. For any one codon, there can be only one _____.

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