TEST BANK

Lehninger Principles of Biochemistry

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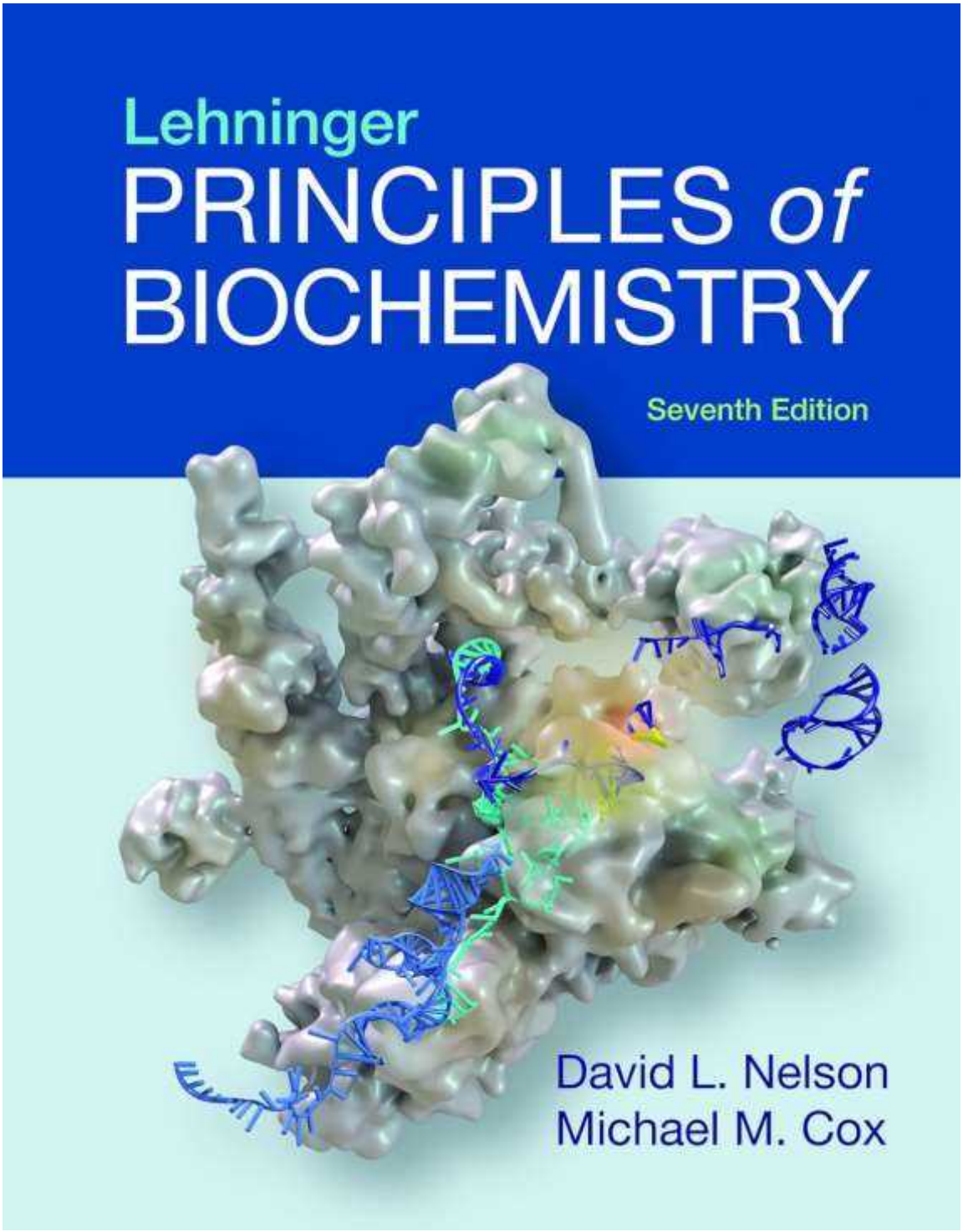
7th Edition



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1. In a bacterial cell, the DNA is in the:
   A) cell envelope.
   B) cell membrane.
   C) nucleoid.
   D) nucleus.
   E) ribosomes.

2. A major change occurring in the evolution of eukaryotes from prokaryotes was the development of:
   A) DNA.
   B) photosynthetic capability.
   C) plasma membranes.
   D) ribosomes.
   E) the nucleus.

3. In eukaryotes, the nucleus is enclosed by a double membrane called the:
   A) cell membrane.
   B) nuclear envelope.
   C) nucleolus.
   D) nucleoplasm.
   E) nucleosome.

4. The dimensions of living cells are limited, on the lower end by the minimum number of biomolecules necessary for function, and on the upper end by the rate of diffusion of solutes such as oxygen. Except for highly elongated cells, they usually have lengths and diameters in the range of:
   A) 0.1 μm to 10 μm.
   B) 0.3 μm to 30 μm.
   C) 0.3 μm to 100 μm.
   D) 1 μm to 100 μm.
   E) 1 μm to 300 μm.

5. Which group of single-celled microorganisms has many members found growing in extreme environments?
   A) bacteria
   B) archaea
   C) eukaryotes
   D) heterotrophs
   E) None of the answers is correct.

6. The bacterium E. coli requires simple organic molecules for growth and energy—it is therefore a:
   A) chemoautotroph.
   B) chemoheterotroph.
   C) lithotroph.
   D) photoautotroph.
   E) photoheterotroph.

7. Which is a list of organelles?
   A) mitochondria, chromatin, endoplasmic reticulum
   B) peroxisomes, lysosomes, plasma membrane
   C) proteasomes, peroxisomes, lysosomes
   D) mitochondria, endoplasmic reticulum, peroxisomes
   E) All of the answers are correct.

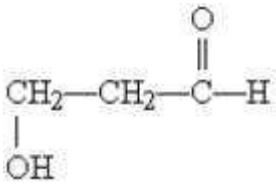
8. Which list has the cellular components arranged in order of INCREASING size?
   A) amino acid < protein < mitochondrion < ribosome
   B) amino acid < protein < ribosome < mitochondrion
   C) amino acid < ribosome < protein < mitochondrion
   D) protein < amino acid < mitochondrion < ribosome
   E) protein < ribosome < mitochondrion < amino acid

9. The three-dimensional structure of macromolecules is formed and maintained primarily through noncovalent interactions. Which one of the following is NOT considered a noncovalent interaction?
   A) carbon-carbon bonds
   B) hydrogen bonds
   C) hydrophobic interactions
   D) ionic interactions
   E) van der Waals interactions

10. Which element is NOT among the four most abundant in living organisms?
    A) carbon
    B) hydrogen
    C) nitrogen
    D) oxygen
    E) phosphorus

11. The four covalent bonds in methane (CH_4) are arranged around carbon to give which geometry?
    A) linear
    B) tetrahedral
    C) trigonal bipyramidal
    D) trigonal planar
    E) trigonal pyramidal

12. What functional groups are present on this molecule?



    A) ether and aldehyde
    B) hydroxyl and aldehyde
    C) hydroxyl and carboxylic acid
    D) hydroxyl and ester
    E) hydroxyl and ketone

13. The macromolecules that serve in the storage and transmission of genetic information are:
    A) carbohydrates.
    B) lipids.
    C) membranes.
    D) nucleic acids.
    E) proteins.

14. Stereoisomers that are nonsuperimposable mirror images of each other are known as:
    A) anomers.
    B) cis-trans isomers.
    C) diastereoisomers.
    D) enantiomers.
    E) geometric isomers.

15. The catalog of all proteins functioning in a cell is the:
    A) metabolome.
    B) proteasome.
    C) lysosome.
    D) proteome.
    E) genome.

16. Use the terms a) chemoautotrophs, b) chemoheterotrophs, c) photoautotrophs, and d) photoheterotrophs and identify the answer that CORRECTLY finishes the statement: Carnivores are _____ and herbivores are _____.
    A) b; c
    B) b; d
    C) b; b
    D) a; b
    E) a; a

17. The enzyme fumarase catalyzes the reversible hydration of fumaric acid to l-malate, but it will not catalyze the hydration of maleic acid, the cis isomer of fumaric acid. This is an example of:
    A) biological activity.
    B) chiral activity.
    C) racemization.
    D) stereoisomerization.
    E) stereospecificity.

18. Humans maintain a nearly constant level of hemoglobin by continually synthesizing and degrading it. This is an example of a(n):
    A) dynamic steady state.
    B) equilibrium state.
    C) exergonic change.
    D) free-energy change.
    E) waste of energy.

19. If heat energy is absorbed by the system during a chemical reaction, the reaction is said to be:
    A) at equilibrium.
    B) endergonic.
    C) endothermic.
    D) exergonic.
    E) exothermic.

20. If the free energy change ΔG for a reaction is –46.11 kJ/mol, the reaction is:
    A) at equilibrium.
    B) endergonic.
    C) endothermic.
    D) exergonic.
    E) exothermic.

21. The major carrier of chemical energy in all cells is:
    A) acetyl triphosphate.
    B) adenosine monophosphate.
    C) adenosine triphosphate.
    D) cytosine tetraphosphate.
    E) uridine diphosphate.

22. Enzymes are biological catalysts that enhance the rate of a reaction by:
    A) decreasing the activation energy.
    B) decreasing the amount of free energy released.
    C) increasing the activation energy.
    D) increasing the amount of free energy released.
    E) increasing the energy of the transition state.

23. Energy requiring metabolic pathways that yield complex molecules from simpler precursors are:
    A) amphibolic.
    B) anabolic.
    C) autotrophic.
    D) catabolic.
    E) heterotrophic.

24. Hereditary information (with the exception of some viruses) is preserved in:
    A) deoxyribonucleic acid.
    B) membrane structures.
    C) nuclei.
    D) polysaccharides.
    E) ribonucleic acid.

25. When a region of DNA must be repaired by removing and replacing some of the nucleotides, what ensures that the new nucleotides are in the correct sequence?
    A) DNA cannot be repaired and this explains why mutations occur.
    B) Specific enzymes bind the correct nucleotides.
    C) The new nucleotides base pair accurately with those on the complementary strand.
    D) The repair enzyme recognizes the removed nucleotide and brings in an identical one to replace it.
    E) The three-dimensional structure determines the order of nucleotides.

26. The three-dimensional structure of a protein is determined primarily by:
    A) electrostatic guidance from nucleic acid structure.
    B) how many amino acids are in the protein.
    C) hydrophobic interaction with lipids that provide a folding framework.
    D) modification during interactions with ribosomes.
    E) the sequence of amino acids in the protein.

27. According to Oparin's theory for the origin of life, the prebiotic atmosphere:
    A) already contained some primitive RNA molecules.
    B) basically was very similar to the atmosphere of today.
    C) contained many amino acids.
    D) had an abundance of methane, ammonia, and water.
    E) was rich in oxygen.

28. When two genes in an organism share detectable sequence similarity, those genes or their gene products, are said to be:
    A) homologues.
    B) orthologues.
    C) paralogues.
    D) both homologues and orthologues.
    E) both homologues and paralogues.
    F) both orthologues and paralogues.

29. Which statement is NOT a distinguishing feature of living organisms?
    A) There exists a high degree of organizational complexity.
    B) The structure of components influences their function.
    C) Organisms can reproduce themselves.
    D) Organisms do not need to interact with their environment.
    E) Organisms change over time.

30. Which organic molecules can be considered “alive”?
    A) proteins
    B) carbohydrates
    C) nucleic acids
    D) saccharides
    E) None of the answers is correct.

31. Which statement is NOT true regarding the plasma membrane?
    A) It is a physical barrier separating the inside of the cell from its surroundings.
    B) It is a flexible, hydrophobic structure.
    C) The individual lipids and proteins of the plasma membrane are covalently linked.
    D) The plasma membrane incorporates newly made lipid and protein components as a cell grows.
    E) Cell division occurs without loss of the membrane integrity.

32. The major difference between prokaryotes and eukaryotes is that:
    A) prokaryotes have a nucleus, while eukaryotes do not.
    B) eukaryotes have a nucleus, while prokaryotes do not.
    C) eukaryotes have double-stranded DNA, while prokaryotes have single-stranded DNA.
    D) prokaryotes have double-stranded DNA, while eukaryotes have single-stranded DNA.
    E) prokaryotes do not have ribosomes.

33. If an organism is a *facultative anaerobe,* which statement is TRUE?
    A) The organism requires sulfur to live.
    B) The organism will die if exposed to oxygen.
    C) The organism requires oxygen to live.
    D) The organism does not require oxygen to live but will not die if exposed to oxygen.
    E) The organism requires methane to live.

34. Which statement is TRUE regarding energy sources used by organisms?
    A) Phototrophs can use carbon dioxide as a carbon source.
    B) Phototrophs can use carbon dioxide as an energy source.
    C) All phototrophs are autotrophs.
    D) All chemotrophs are heterotrophs.
    E) All phototrophs are autotrophs that can use carbon dioxide as a carbon source.

35. Which statement is FALSE regarding bacterial and archaeal cells?
    A) Archaeal and bacterial plasma membranes consist of a thin bilayer of lipid molecules penetrated by proteins.
    B) Bacteria and archaea have group specific specializations in their cell envelope.
    C) Archaea can have a single- or double-layered membrane.
    D) Bacteria can have a single- or double-layered membrane.
    E) Both bacteria and archaea have a layer of peptidoglycan in their cell envelope.

36. Which organelle does NOT consist of a double membrane?
    A) mitochondrion
    B) ribosome
    C) chloroplast
    D) endoplasmic reticulum
    E) Golgi body

37. Which method is MOST useful when fractionating cellular organelles?
    A) centrifugation
    B) precipitation
    C) chromatography
    D) restriction digest
    E) peroxidation

38. Which organelle is NOT found in plant cells?
    A) ribosome
    B) lysosome
    C) chloroplast
    D) vacuole
    E) mitochondrion

39. Which reason is MOST probable for why carbon is used in living organisms but not silicon?
    A) Carbon can make four bonds, whereas silicon can only make three.
    B) Carbon can make double bonds, but silicon cannot.
    C) Carbon can form more preferred geometries when bonding.
    D) Carbon is lighter, and therefore its bonds are stronger.
    E) Silicon is heavier, and therefore its bonds are stronger.

40. Which group includes the four most abundant elements in living organisms?
    A) carbon, hydrogen, oxygen, iron
    B) carbon, hydrogen, nitrogen, oxygen
    C) carbon, hydrogen, phosphorous, oxygen
    D) carbon, nitrogen, phosphorous, oxygen
    E) carbon, hydrogen, sulfur, oxygen