Biology: Science for Life with Physiology, 4e (Belk)

Chapter 2 Are We Alone in the Universe? Water, Biochemistry, and Cells

- 1) Each of the following is a feature of all known living things EXCEPT
- A) genes made from proteins.
- B) growth.
- C) homeostasis.
- D) metabolism.

Answer: A
Diff: 1
Topic: 2.1

Skill: Factual

- 2) Which term best describes the water in a sugar-water solution?
- A) product
- B) reactant
- C) solute
- D) solvent

Answer: D

Diff: 1 Topic: 2.1

Skill: Conceptual

- 3) Which term best describes the sugar in a sugar-water solution?
- A) product
- B) reactant
- C) solute
- D) solvent

Answer: C

Diff: 1

Topic: 2.1

Skill: Conceptual

- 4) Because the electrons in a water molecule are shared unequally between hydrogen and oxygen, water is said to be
- A) hydrophobic.
- B) ionic.
- C) noncovalent.
- D) polar.

Answer: D

Diff: 2 Topic: 2.1 Skill: Factual

- 5) Which of the following are found in the nucleus of an atom?
- A) electrons and neutrons
- B) neutrons and protons
- C) protons and electrons
- D) neutrons, electrons, and protons

Answer: B
Diff: 1
Topic: 2.1
Skill: Factual

- 6) Nonliving things include fire, water, and viruses. Many features of living things are also found in nonliving things. Of the following features, which is most likely to be absent in nonliving things?
- A) consumption of energy-containing molecules
- B) homeostasis
- C) reproduction
- D) response to external stimuli

Answer: B Diff: 2 Topic: 2.1

Skill: Conceptual

- 7) An atom will be least likely to form chemical bonds with other atoms when
- A) the number of protons equals the number of electrons.
- B) the number of protons equals the number of neutrons.
- C) there is only one electron in the valence shell.
- D) the valence shell is full of electrons.

Answer: D Diff: 2 Topic: 2.1

Skill: Conceptual

- 8) What type of chemical bond connects the complementary strands of a DNA molecule to each other?
- A) hydrogen bonds
- B) ionic bonds
- C) nonpolar covalent bonds
- D) polar covalent bonds

Answer: A
Diff: 1
Topic: 2.1
Skill: Factual

- 9) If life on Mars is fundamentally like life on Earth, its macromolecules will be based on which element?
- A) carbon
- B) hydrogen
- C) nitrogen
- D) oxygen

Answer: A Diff: 1 Topic: 2.1

Skill: Conceptual

- 10) Imagine a newly discovered biological molecule that is mostly hydrophobic in its structure. This new molecule will most likely be classified as a
- A) carbohydrate.
- B) lipid.
- C) nucleic acid.
- D) protein. Answer: B Diff: 2 Topic: 2.1

Skill: Conceptual

- 11) Which of the following pairs of molecules can be held together by a hydrogen bond?
- A) one polar molecule and one nonpolar molecule
- B) two ions
- C) two nonpolar molecules
- D) two polar molecules

Answer: D Diff: 2 Topic: 2.1

Skill: Conceptual

- 12) What kind of bond holds the atoms of a single water molecule together?
- A) hydrogen bonds
- B) ionic bonds
- C) covalent bonds that are not polar
- D) covalent bonds that are polar

Answer: D Diff: 2 Topic: 2.1 Skill: Factual

13) What kind of bond holds two water molecules to each other?
A) hydrogen bonds
B) ionic bonds
C) nonpolar covalent bonds
D) polar covalent bonds
Answer: A
Diff: 2
Topic: 2.1 Skill: Factual
Skiii. Pactual
14) In general, what makes one kind of amino acid different from other amino acids?
A) the amino group
B) the carboxyl group
C) the side group
D) the type of bonds
Answer: C
Diff: 1
Topic: 2.1
Skill: Factual
15) Which macromolecule has a sugar-phosphate backbone?
A) lipid
B) nucleic acid
C) protein
D) polysaccharide
Answer: B
Diff: 1
Topic: 2.1
Skill: Factual
16) The atomic number of an element refers to the number of in one atom of that element.
A) electrons
B) neutrons
C) protons
D) protons plus neutrons
Answer: C
Diff: 1
Topic: 2.1 Skill: Factual
Skiii. 1 detudi
17) How do the concentrations of H ⁺ and OH ⁻ compare to each other in an acidic solution?
A) The concentration of H ⁺ is higher.
B) The concentration of H ⁺ is lower.
C) The concentration of H ⁺ is the same.
D) Acidic solutions do not contain H ⁺ .
Answer: A
Diff: 1
Topic: 2.1
Skill: Conceptual

- 18) What is the pH of a neutral solution? A) 1 B) 5 C) 7 D) 9 Answer: C Diff: 1 Topic: 2.1 Skill: Factual 19) A molecule that is composed only of chains and rings of hydrogen and carbon is called a A) carbohydrate. B) hydrocarbon. C) polypeptide. D) polysaccharide. Answer: B Diff: 1 Topic: 2.1 Skill: Factual 20) What is the name of a molecule composed of one or more sugars? A) carbohydrate B) lipid C) nucleic acid D) polypeptide Answer: A Diff: 1 Topic: 2.1 Skill: Factual 21) Polysaccharides are polymers of
- A) amino acids.
- B) fatty acids.
- C) nucleotides.
- D) sugars.

Answer: D

Diff: 1

Topic: 2.1

Skill: Factual

- 22) Proteins are polymers of
- A) amino acids.
- B) fatty acids.
- C) nucleotides.
- D) sugars.

Answer: A

Diff: 1

Topic: 2.1

Skill: Factual

- 23) Nucleic acids are polymers of
- A) amino acids.
- B) fatty acids.
- C) nucleotides.
- D) sugars.

Answer: C

Diff: 1 Topic: 2.1 Skill: Factual

- 24) Which of the following is a lipid?
- A) cellulose
- B) cholesterol
- C) sucrose
- D) ribonucleic acid

Answer: B
Diff: 1
Topic: 2.1
Skill: Factual

- 25) What is the name for the ability of living things to maintain a relatively constant internal environment?
- A) cellular respiration
- B) homeostasis
- C) metabolism
- D) stimulus-response

Answer: B
Diff: 1
Topic: 2.1
Skill: Factual

- 26) Sodium chloride is composed of molecules that are stable when dry. In the presence of water, however, the atoms that compose the molecules separate from each other. What type of chemical bond holds the dry substance together?
- A) hydrogen bonds
- B) ionic bonds
- C) nonpolar covalent bonds
- D) polar covalent bonds

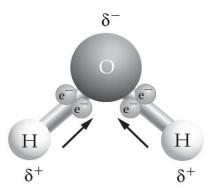
Answer: B Diff: 2 Topic: 2.1

Skill: Conceptual

	sified as a lipid because it contains a large proportion of
A) carbohydrates.B) phosphates.	
,	
C) glycerol.	
D) hydrocarbons.	
Answer: D	
Diff: 1	
Topic: 2.1	
Skill: Conceptual	
28) Enzymes are	
A) carbohydrates.	
B) lipids.	
C) nucleic acids.	
D) proteins.	
Answer: D	
Diff: 1	
Topic: 2.1	
Skill: Factual	
29) The of a	n organism is defined as all the chemical processes that occur in the cells of that
organism.	
Answer: metabolism	
Diff: 1	
Topic: 2.1	
Skill: Factual	
20) in the ab	ilitar of living things to maintain a malatival account internal anxionment area
	ility of living things to maintain a relatively constant internal environment even
when the external envir	onnent is changing.
Answer: Homeostasis Diff: 1	
Topic: 2.1	
Skill: Factual	
Skiii. Factual	
31) are the s	mallest units into which an element can be broken down.
Answer: Atoms	
Diff: 1	
Topic: 2.1	
Skill: Factual	
32) Proteins are compo	osed of monomer subunits called (two words).
Answer: amino acids	
Diff: 1	
Topic: 2.1	
Skill: Factual	

33) Which of the following is considered part of a life-form's metabolism? A) secretion of wastes B) growth and development C) responses to external stimuli D) reproduction Answer: A Diff: 1 Topic: 2.1 Skill: Factual
34) Which of the following is an element? A) water B) methane C) hydrogen D) carbon dioxide Answer: C Diff: 1 Topic: 2.1 Skill: Factual
35) Protons have a charge and, collectively, give an element its A) negative; polarity B) positive; atomic number C) negative; electronegativity D) positive; ionic charge Answer: B Diff: 1 Topic: 2.1 Skill: Factual
36) Which of the following is nonpolar? A) a positive ion B) a negative ion C) a neutral ion D) a molecule with no partial charges Answer: D Diff: 1 Topic: 2.1 Skill: Conceptual
 37) Oxygen in highly electronegative, meaning that it A) pulls electrons toward itself. B) is nonpolar. C) repels electrons away from its nucleus and into the outermost electron shell. D) discharges electrons readily out of the atom. Answer: A Diff: 1 Topic: 2.1 Skill: Factual

38) A solution with a pH of 2 has an H ⁺ ion concentration that is	than a solution with a pH of
4.	
A) 2 times higher B) 10 times lower	
C) 100 times lower	
D) 1000 times lower	
Answer: C	
Diff: 3	
Topic: 2.1	
Skill: Applied	
39) Which of the following has the lowest OH- concentration?	
A) baking soda	
B) pure water	
C) coffee	
D) battery acid	
Answer: D	
Diff: 3	
Topic: 2.1	
Skill: Conceptual	
40) Which pH represents an equal number of H ⁺ and OH ⁻ ions?	
A) 1	
B) 5	
C) 7	
D) 10	
Answer: C	
Diff: 1	
Topic: 2.1	
Skill: Factual	
41) Which of the following could accept one (and only one) electron?	
A) carbon (atomic number = 6)	
B) nitrogen (atomic number = 7)	
C) oxygen (atomic number $= 8$)	
D) hydrogen (atomic number = 1)	
Answer: D	
Diff: 3	
Topic: 2.1	
Skill: Applied	



- 42) Use the figure to answer the following question. If two or more of these molecules are in proximity to one another, how will they bond together?
- A) hydrogen bonding, with two hydrogen atoms bonded together
- B) covalent bonding, with two oxygen atoms bonded together
- C) hydrogen bonding, with a hydrogen atom bonded to an oxygen atom
- D) ionic bonding, with a hydrogen ion bonded to an oxygen atom

Answer: C Diff: 2 Topic: 2.1 Skill: Applied

- 43) Which organelle contains digestive enzymes that degrade a variety of macromolecules?
- A) chloroplast
- B) endoplasmic reticulum
- C) lysosome
- D) mitochondrion

Answer: C Diff: 1 Topic: 2.2 Skill: Factual

- 44) Which organelle is found in plant cells but not in animal cells?
- A) chloroplast
- B) endoplasmic reticulum
- C) centriole
- D) mitochondrion

Answer: A Diff: 2 Topic: 2.2 Skill: Factual

- 45) Which organelle performs photosynthesis?
- A) chloroplast
- B) Golgi apparatus
- C) lysosome
- D) mitochondrion

Answer: A
Diff: 1
Topic: 2.2
Skill: Factual

- 46) Which organelle performs cellular respiration?
- A) endoplasmic reticulum
- B) Golgi apparatus
- C) lysosome
- D) mitochondrion

Answer: D
Diff: 1
Topic: 2.2
Skill: Factual

47) Cells contain proteins that help transport substances from the exterior to the interior of the cell.

Where are these proteins found?

- A) Golgi apparatus
- B) lysosome
- C) mitochondrion
- D) plasma membrane

Answer: D Diff: 2 Topic: 2.2

Skill: Conceptual

- 48) Which organelle is represented by a network of membranes involved in the production of proteins?
- A) chloroplast
- B) endoplasmic reticulum
- C) lysosome
- D) nucleus

Answer: B
Diff: 1
Topic: 2.2
Skill: Factual

- 49) Which organelle is a stack of membranous sacs that are involved in sorting proteins to their proper cellular location?
- A) centriole
- B) endoplasmic reticulum
- C) Golgi apparatus
- D) lysosome

Answer: C Diff: 1 Topic: 2.2

Skill: Factual

- 50) Which cell component is composed of microtubules and helps move chromosomes around during cell division? A) centriole B) chromatin C) cytoskeletal element D) nucleolus Answer: A Diff: 1 Topic: 2.2 Skill: Factual 51) Microtubules, microfilaments, and intermediate filaments compose what part of a cell? A) centriole B) cholesterol C) chromatin D) cytoskeletal elements Answer: D Diff: 1 Topic: 2.2 Skill: Factual 52) What kind of molecule forms a bilayer that is the basis for all cellular membranes? A) carbohydrate B) cholesterol C) phospholipid D) protein Answer: C Diff: 1 Topic: 2.2 Skill: Factual 53) In what unit of a eukaryotic cell are ribosomes made? A) endoplasmic reticulum B) Golgi apparatus C) lysosome D) nucleolus Answer: D Diff: 1 Topic: 2.2 Skill: Factual 54) Which feature is found in both prokaryotic and eukaryotic cells? A) mitochondrion
- B) Golgi body
- C) DNA
- D) centriole

Answer: C

Diff: 1 Topic: 2.2 Skill: Factual

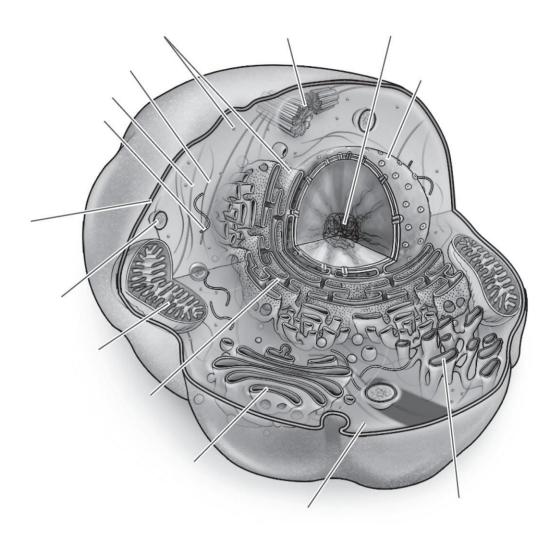
55) According to the theory of evolution, which states that all life-forms on Earth arose from a common ancestor, all living organisms					
A) share a common organic chemistry.					
B) have DNA within their nucleus. C) exhibit the same basic cell wall. D) perform the same mode of reproduction.					
					Answer: A
					Diff: 2
Topic: 2.2					
Skill: Conceptual					
56) The internal membrane-bound compartments found in eukaryotic cells are called					
Answer: organelles					
Diff: 1					
Topic: 2.2					
Skill: Factual					
57) The (tryo yeards) defines the outer houndary of all calls, concreting the call's contents from					
57) The (two words) defines the outer boundary of all cells, separating the cell's contents from					
its environment.					
Answer: plasma membrane					
Diff: 1 Topic: 2.2					
Skill: Factual					
Skiii. Factual					
58) Proteins in cells are assembled on workbench-like structures called					
Answer: ribosomes					
Diff: 1					
Topic: 2.2					
Skill: Factual					
59) Inside a eukarotic cell, the organelles are located within a watery matrix called the					
Answer: cytosol					
Diff: 1					
Topic: 2.2					
Skill: Factual					
60) The is the compartment in a eukaryotic cell that stores DNA in the form of chromatin.					
Answer: nucleus					
Diff: 2					
Topic: 2.2					
Skill: Factual					

A) a nucleus. B) endoplasmic reticulum. C) Golgi apparatus. D) a cell wall. Answer: D Diff: 1 Topic: 2.2 Skill: Factual
62) The purported fossils in meteorite ALH84001 resemble modern prokaryotes called A) nanobacteria. B) amoebas. C) fungi. D) nucleoids. Answer: A Diff: 2 Topic: 2.2 Skill: Factual
63) Scientists believe that the first prokaryotes on Earth arose over years ago, and the first eukaryotes arose about years later. A) 3.5 million; 1.7 million B) 1.7 million; 3.5 million C) 3.5 billion; 1.7 billion D) 1.7 billion; 3.5 billion Answer: C Diff: 1 Topic: 2.2 Skill: Factual
64) Prokaryotic cells are generally the diameter of eukaryotic cells. A) twice B) one-half C) one-tenth D) one-thousandth Answer: C Diff: 3 Topic: 2.2 Skill: Factual
 65) The plasma membrane of a photosynthetic eukaryotic cell A) converts carbon dioxide and water into sugars. B) isolates the cell's contents from the external environment. C) controls protein synthesis in the cell. D) is composed of cellulose. Answer: B Diff: 2 Topic: 2.2 Skill: Conceptual

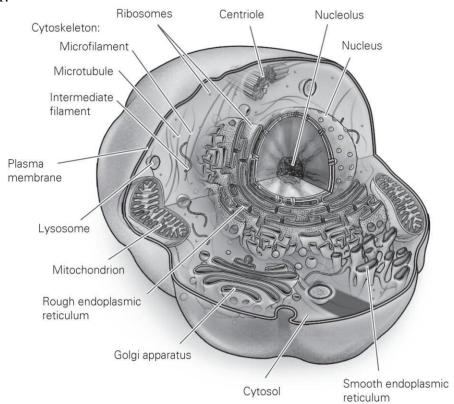
66) The reactions of cellular respiration occur in the A) nucleolus of the nucleus. B) ribosomes of the rough endoplasmic reticulum. C) matrix of the mitochondria. D) hydrophobic core of the outermost cell plasma membrane. Answer: C Diff: 3 Topic: 2.2 Skill: Factual
67) The liquid interior of the chloroplast is called the A) centriole. B) chromatin. C) Golgi apparatus. D) stroma. Answer: D Diff: 2 Topic: 2.2 Skill: Factual
68) The antibiotic streptomycin prevents protein synthesis in prokaryotes. Which cell component is the most likely target of this antibiotic? A) ribosome B) cell membrane C) Golgi apparatus D) cell wall Answer: A Diff: 3 Topic: 2.2 Skill: Applied
69) Assume that a plant is suffering from drought and is beginning to wilt. Which cell component is most likely being affected, and what type of molecule is being lost from this structure? A) endoplasmic reticulum; protein B) Golgi apparatus; water C) lysosome; enzymes D) vacuole; water Answer: D Diff: 1 Topic: 2.2 Skill: Conceptual
70) Cell membranes are, which means that they allow certain molecules to pass through while preventing the passage of other molecules. Answer: semipermeable Diff: 1 Topic: 2.2 Skill: Factual

/1) Mitochondri	a convert food energy into a high-energy molecule that is directly usable by the cell,
called	
Answer: ac	denosine triphosphate
Diff: 2	
Topic: 2.2	
Skill: Factual	
72) Which organ	nelle in a scavenging white blood cell would break down bacteria that had entered the
body?	
Answer: lysoson	me
Diff: 1	
Topic: 2.2	
Skill: Factual	
73) The	is the fundamental structural unit of life on Earth.
Answer: cell	
Diff: 1	
Topic: 2.2	
Skill: Factual	

74) Label the parts of the animal cell.



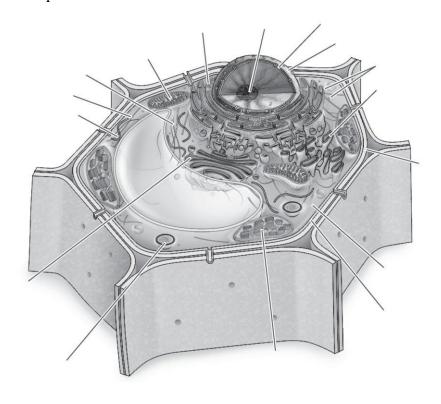
Answer:



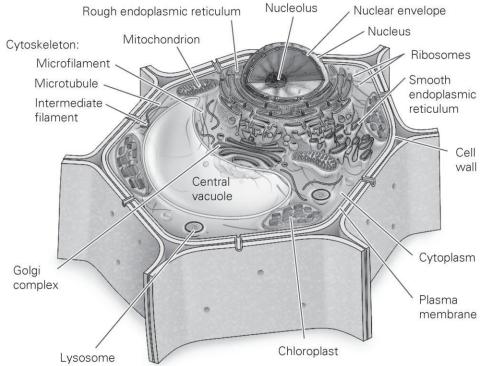
Diff: 2 Topic: 2.2 Skill: Factual

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75) Label the parts of the plant cell.



Answer:



Diff: 2 Topic: 2.2 Skill: Factual

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