

TEST BANK



A Brief Guide to
Biology



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

- 1) What do testosterone and the synthetic drug THG have in common? 1) _____
- A) Both are steroids.
 - B) Both are made of carbon, hydrogen, and oxygen.
 - C) Both are essential for normal growth.
 - D) Both A and B are correct.
 - E) All the above are correct.

Answer: D

- 2) Hydrogen differs from helium in that 2) _____
- A) hydrogen is an atom and helium is not.
 - B) hydrogen has one more electron than does helium.
 - C) hydrogen has no neutrons whereas helium does.
 - D) none of the above is correct.

Answer: C

- 3) The nucleus of an atom is composed of 3) _____
- A) protons and electrons.
 - B) protons and neutrons.
 - C) neutrons and electrons.
 - D) none of the above.

Answer: B

- 4) A substance with specific properties, and which cannot be broken down or converted into another substance, is 4) _____
- A) a mixture.
 - B) a compound.
 - C) an ion.
 - D) a molecule.
 - E) an element.

Answer: E

- 5) Which is true of the nucleus of an atom? 5) _____
- A) The electrical charge of the proton balances the electrical charge of the neutron.
 - B) It has a negative electrical charge.
 - C) It has a positive electrical charge.
 - D) It has no electrical charge.

Answer: C

- 6) Which is true of an atom that is electrically neutral? 6) _____
- A) The electrical charge of the electrons balances the electrical charge of the neutrons.
 - B) The nucleus has at least 2 neutrons and 2 electrons.
 - C) The electrical charge of the neutrons balances the electrical charge of the protons.
 - D) None of the above is correct.

Answer: D

- 7) How does the common form of hydrogen differ from deuterium and tritium? 7) _____
- A) Hydrogen is very stable whereas deuterium and tritium are very reactive.
 - B) Hydrogen has no protons whereas deuterium and tritium have one each.
 - C) Hydrogen has no neutrons whereas deuterium and tritium have neutrons.
 - D) Hydrogen has no electrons whereas deuterium and tritium have 2 electrons.

Answer: C

- 8) Which of the following is true of matter? 8) _____
A) Molecules are the fundamental building blocks of matter.
B) All matter carries a negative electrical charge.
C) It is composed of elements.
D) Both B and C are true of matter.

Answer: C

- 9) How many energy levels does hydrogen have? 9) _____
A) One B) Two C) Four D) Three

Answer: A

- 10) What do H₂O and CO₂ have in common? 10) _____
A) Both are elements.
B) Both are molecules.
C) Both are composed of 3 atoms.
D) Only B and C are correct.
E) All the above are correct.

Answer: D

- 11) Carbon-16 is similar to carbon-14 in that 11) _____
A) both have an atomic number of 6.
B) both have 6 protons.
C) both have 6 neutrons.
D) only A and B are ways they are similar.
E) all the above are ways they are similar.

Answer: D

- 12) Deuterium is an isotope of 12) _____
A) helium. B) oxygen.
C) carbon. D) none of the above.

Answer: D

- 13) A covalent bond is one in which 13) _____
A) one atom loses an electron. B) two atoms share electrons.
C) there is a negative electrical charge. D) there is a positive electrical charge.

Answer: B

- 14) A molecule differs from an element in that a molecule 14) _____
A) is always positively charged.
B) is always stable.
C) is composed of 2 or more atoms.
D) is composed of one atom.
E) Both A and D are correct.

Answer: C

- 15) The physical size of an atom is largely determined by 15) _____
A) the number of energy levels it has. B) the number of isotopes it has.
C) the number of protons it has. D) the number of neutrons it has.

Answer: A

- 16) How many energy levels (or shells) would you expect gold, which has an atomic number of 79, to have? 16) _____

- A) Two B) Less than 5 C) More than 5 D) One
Answer: C

- 17) What do all isotopes of oxygen have in common? 17) _____
A) The number of energy levels
B) The number of neutrons
C) The number of protons
D) Only A and C are correct.
E) All of the above are correct.

Answer: D

- 18) Deuterium, an isotope of hydrogen, differs from elemental hydrogen in that deuterium 18) _____
A) has 2 more protons than hydrogen.
B) has one more energy level than hydrogen.
C) has 1 more electron than hydrogen.
D) none of the above is correct.

Answer: D

- 19) Which of the following is **NOT** a type of chemical bond? 19) _____
A) Covalent B) Ionic C) Gravitational D) Hydrogen

Answer: C

- 20) A stable atom is possible when 20) _____
A) it has a filled outer energy shell. B) it combines with oxygen.
C) it is radioactive. D) it has at least 4 protons in the nucleus.

Answer: A

- 21) An atom whose atomic number is 8 has how many electrons in its outermost energy level? 21) _____
A) Five B) Three C) Two D) Six E) Eight

Answer: D

- 22) The formation of sodium chloride (NaCl) is the result of 22) _____
A) covalent bonding.
B) hydrogen bonding.
C) chemical unreactivity.
D) attraction between opposite charges.
E) both A and C.

Answer: D

- 23) Which of the following isotopes is commonly used in radioactive dating techniques? 23) _____
A) Carbon-14 B) Carbon-12 C) Tritium D) Oxygen-10

Answer: A

- 24) What component of an atom determines its bonding with other atoms? 24) _____
A) Protons B) Nucleus C) Neutrons D) Electrons

Answer: D

- 25) An ion results when an atom 25) _____
A) gains or loses protons. B) gains or loses electrons.
C) gains or loses neutrons. D) forms a covalent bond.

Answer: B

- 26) Carbon has an atomic number of six. Carbon most likely 26) _____
A) shares protons.
B) shares electrons.
C) loses protons.
D) gains electrons.
E) loses electrons.

Answer: B

- 27) Hydrogen bonds are very important in which of the following molecules? 27) _____
A) Fats
B) Proteins
C) Sugars
D) Only A and C are true.
E) All of the above.

Answer: B

- 28) Polar molecules result when 28) _____
A) there is an unequal sharing of electrons. B) there are 4 or more atoms involved.
C) there is an equal sharing of electrons. D) both B and C are true.

Answer: A

- 29) How many carbon atoms are found in sucrose (regular table sugar)? 29) _____
A) 5 B) 22 C) 12 D) 11

Answer: C

- 30) Which of the following is **NOT** a compound? 30) _____
A) Water
B) Carbon
C) Carbon dioxide
D) Sucrose
E) Protein

Answer: B

- 31) Which of the following is true of chemical bonds? 31) _____
A) All bonds involve two atoms that share an electron unequally.
B) One atom can give up an electron to another to form bonds.
C) Atoms achieve a higher energy state and less stability by forming bonds.
D) A and C are true of chemical bonds.

Answer: B

- 32) The "2" in H₂O refers to 32) _____
A) the type of isotope. B) the number of protons in hydrogen.
C) the number of molecules of water. D) the number of atoms of hydrogen.

Answer: D

- 33) A reactive atom will become stable when 33) _____
A) it bonds with at least one hydrogen atom.
B) each energy level has no more than 2 electrons.
C) it fills its outermost energy level.
D) both A and C are true.

Answer: C

34) Glucose, $C_6H_{12}O_6$, is made up of a total of _____ atoms. 34) _____
A) 24 B) 12
C) 6 D) none of the above
Answer: A

35) The symbol $4H_2O$ represents 35) _____
A) four atoms of hydrogen. B) four molecules of water.
C) four molecules of oxygen. D) none of the above.
Answer: B

36) A hydrogen bond is similar to an ionic bond in that both 36) _____
A) involve an equal sharing of electrons between atoms.
B) involve atoms that carry differences in electrical charge.
C) result in the formation of isotopes.
D) Both B and C are correct.
Answer: B

37) Chemical reactions that occur between 2 or more atoms result in changes in 37) _____
A) the formation of isotopes. B) the atomic number of each atom.
C) the nucleus of the atoms. D) none of the above is true.
Answer: D

38) A polar covalent bond is typical of _____ molecules. 38) _____
A) carbon dioxide B) water C) glucose D) protein
Answer: B

39) Which of the following molecules is the result of an ionic bond? 39) _____
A) Sodium
B) Gold
C) Sodium chloride
D) Table salt
E) Both C and D
Answer: E

40) Molecular shape is important in chemistry and biology for the same reason(s) that 40) _____
A) a square peg fits into a square hole but not into a round hole.
B) your left hand fits into a left glove but doesn't fit into a right glove.
C) you need a 7 mm span wrench to fit a 7 mm bolt.
D) all of the above.
E) none of the above.
Answer: D

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

41) Why would some elite athletes such as professional baseball players take anabolic steroids? 41) _____
Answer: Anabolic steroids build muscle mass thus making an athlete stronger.

42) How does a stable isotope differ from an unstable isotope? 42) _____
Answer: Stable isotopes are not radioactive whereas unstable isotopes are radioactive.

43) What do deuterium and tritium have in common? 43) _____
Answer: Both have one proton and are isotopes of hydrogen.

- 44) Explain why both hydrogen and helium have only one energy level, yet hydrogen is more reactive than helium. 44) _____
Answer: The outer shell of helium has its maximum of 2 electrons and is therefore less reactive than hydrogen, which has only one electron in its outer shell and is therefore in an unstable state.
- 45) What three elements make up simple table sugar? 45) _____
Answer: Carbon, hydrogen and oxygen are found in table sugar.
- 46) How does the reactivity of an atom with an atomic number of 10 compare with the reactivity of an atom with an atomic number of 5? 46) _____
Answer: The atom with an atomic number of 5 will be more reactive than the atom with an atomic number of 10 because the former has an unfilled outer shell thus making it more likely to combine with other atoms in order to share electrons.
- 47) Water molecules tend to link together, resulting in large aggregations of molecules that give water its "flowing" quality. Explain why large numbers of water molecules link together. 47) _____
Answer: Water molecules are polar; thus the oxygen region of the molecule, which has a partial negative charge, bonds with the partial positive charge of hydrogen on an adjacent water molecule resulting in large aggregations of bonded water molecules and its flowing quality.
- 48) Would you expect hydrogen bonds or ionic bonds to be stronger? 48) _____
Answer: The positive hydrogen atom is weakly attracted to the negative, unshared electron of another atom, thus the resulting bond can be easily broken. Ionic bonds on the other hand are generally stronger as the charge differences between two atoms are more extreme, thus resulting in a stronger bond.
- 49) In chemical terms, explain what rust is. 49) _____
Answer: Rust results when a piece of metal has been oxidized (i.e., oxygen atoms pull electrons off the metal).
- 50) Orange juice is often touted by nutritionists as an excellent antioxidant. What is an antioxidant's function? 50) _____
Answer: Antioxidants scavenge or neutralize free radicals, thus decreasing the amount of damage free radicals have on human cells.

- 1) D
- 2) C
- 3) B
- 4) E
- 5) C
- 6) D
- 7) C
- 8) C
- 9) A
- 10) D
- 11) D
- 12) D
- 13) B
- 14) C
- 15) A
- 16) C
- 17) D
- 18) D
- 19) C
- 20) A
- 21) D
- 22) D
- 23) A
- 24) D
- 25) B
- 26) B
- 27) B
- 28) A
- 29) C
- 30) B
- 31) B
- 32) D
- 33) C
- 34) A
- 35) B
- 36) B
- 37) D
- 38) B
- 39) E
- 40) D
- 41) Anabolic steroids build muscle mass thus making an athlete stronger.
- 42) Stable isotopes are not radioactive whereas unstable isotopes are radioactive.
- 43) Both have one proton and are isotopes of hydrogen.
- 44) The outer shell of helium has its maximum of 2 electrons and is therefore less reactive than hydrogen, which has only one electron in its outer shell and is therefore in an unstable state.
- 45) Carbon, hydrogen and oxygen are found in table sugar.
- 46) The atom with an atomic number of 5 will be more reactive than the atom with an atomic number of 10 because the former has an unfilled outer shell thus making it more likely to combine with other atoms in order to share electrons.
- 47) Water molecules are polar; thus the oxygen region of the molecule, which has a partial negative charge, bonds with the partial positive charge of hydrogen on an adjacent water molecule resulting in large aggregations of bonded

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- 50) Antioxidants scavenge or neutralize free radicals, thus decreasing the amount of damage free radicals have on human cells.