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CORRECT ANSWERS ARE LOCATED IN THE 2ND HALF OF THIS DOC.

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

1) Buffers always release H^+ ions into solution to stabilize pH.
   - ◎ true
   - ◎ false

2) Nonpolar molecules, such as fats, are water-soluble.
   - ◎ true
   - ◎ false

3) While exercising you begin to sweat. Sweating is cooling your body because when the sweat evaporates, it takes energy with it, in the form of heat.
   - ◎ true
   - ◎ false

4) Two hydrophobic molecules in a cell membrane would form a hydrogen bond.
   - ◎ true
   - ◎ false

5) You are chemically analyzing a new compound. It does not dissolve in water. You characterize it as being hydrophilic. TBEXAM.COM
   - ◎ true
   - ◎ false

6) Covalent bonds between water molecules require a high amount of energy to break which is why water heats slowly.
   - ◎ true
   - ◎ false

7) Ionic bonds of salt molecules form between negative sodium molecules and positive chlorine atoms resulting in crystal formation.
   - ◎ true
   - ◎ false

8) One property of ionic bonds that makes them form crystals is that they are not directional.
   - ◎ true
   - ◎ false

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CHECK ALL THE APPLY. Choose all options that best completes the statement or answers the question.

9) Which of the below are unique characteristics of water that are attributable to its ability to form hydrogen bonds? Check all that apply.
   A) Water does not stick to other polar molecules.
   B) When water evaporates it takes up energy in the form of heat.
   C) The water form of ice is less dense than the liquid form.
   D) Water heats up more slowly than most other compounds.
   E) Nonpolar molecules are very soluble in water.

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

10) The nucleus of an atom is composed of
   A) protons and neutrons.
   B) protons and electrons.
   C) only electrons.
   D) only protons.
   E) only neutrons.

11) Atoms that have a positive or negative charge are known as
   A) magnetic.
   B) electrically neutral.
   C) ions.
   D) protons.
   E) stable.

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12) The chemical behavior of an atom is determined by its
   A) protons.
   B) neutrons.
   C) nuclei.
   D) electrons.
   E) mass.

13) In an electrically neutral atom, the number of protons is always
   A) equal to the electrons.
   B) more than the electrons.
   C) more than the neutrons.
   D) less than the neutrons.
   E) less than the electrons.

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14) The volume of space around a nucleus where an electron is most likely to be located is called the_____ of that electron.
A) parameter
B) spin
C) pathway
D) orbital
E) nucleus

15) Electrons possess energy of position, also known as_____ energy.
A) kinetic
B) latent
C) potential
D) opposition
E) excitable

16) Most elements in nature exist as mixtures of
A) unreactive atoms.
B) different isotopes.
C) gases.
D) liquids.
E) stable ions.

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17) Carbon-14 is
A) an important ion used in chemical reactions.
B) the most common form of carbon.
C) an isotope used in dating fossils.
D) widely used in hydrogen bonds.
E) All of the answer choices are correct.

18) When an electron is transferred from one atom to another, the two atoms will then be electrically attracted to one another. This results in the formation of a(an)_____ bond.
A) hydrogen
B) covalent
C) kinetic
D) ionic
E) static

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19) What type of bond forms between two atoms sharing electrons?
A) hydrogen
B) covalent
C) kinetic
D) ionic
E) static

20) Water molecules bond to each other via hydrogen bonds. These bonds form between the slight negative charge of _____, and the slight positive charge of _____, on adjacent water molecules.
A) oxygen; hydrogen
B) hydrogen; carbon
C) hydrogen; oxygen
D) oxygen; carbon
E) hydrogen; nitrogen

21) A solution with a pH of 4 has_____ times the concentration of H^+ present compared to a solution with a pH of 5.
A) 10
B) 100
C) 2
D) 1,000
E) 200

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22) The mass number of an atom is the number of
A) neutrons only.
B) electrons plus the number of protons.
C) protons only.
D) protons plus the number of neutrons.
E) electrons, plus the number of neutrons, plus the number of protons.

23) The atomic number of an atom is the number of
A) neutrons only.
B) electrons plus the number of protons.
C) protons only.
D) protons plus the number of neutrons.
E) electrons, plus the number of neutrons, plus the number of protons.

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24) The first shell in any atom contains one orbital which may contain as many as
A) 2 electrons.
B) 8 protons.
C) 8 electrons.
D) 4 neutrons.
E) 2 neutrons.

25) The second shell in an atom contains_____ orbitals and holds up to_____ electrons.
A) 4; 4
B) 3; 2
C) 4; 8
D) 3; 8
E) 8; 24

26) If an element has an atomic number of 6 and a mass number of 14, how many neutrons does it have?
A) 6
B) 14
C) 7
D) 8
E) 28

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27) If you were grading an exam about water, which statement would lose points?
A) Hydrogens have partial negative charges.
B) Water is a polar molecule.
C) Covalent bonds exist within a water molecule.
D) Hydrogen bonds exist between water molecules.
E) Hydrogen bonds are relatively weak bonds.

28) Which type of chemical substance lowers the H^+ concentration in a solution?
A) ice
B) acid
C) base
D) buffer
E) hydrogen ion

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29) Water moving up into a paper towel, a polar substance, is attributable to
A) heat storage.
B) high heat of vaporization.
C) electronegativity.
D) cohesion.
E) adhesion.

30) If you wanted to stop an insect from walking on water, you would need to add something to the water to stop
A) high heat of vaporization.
B) cohesion.
C) adhesion.
D) polar covalent bonds.
E) heat storage.

31) Doctors prescribe medicines to help the symptoms of acid reflux which cause burning in the esophagus from excess acid in the stomach. To help neutralize the acid, medicines are used to
A) accept excess H^+.
B) accept excess OH^-.
C) donate excess H^+.
D) donate excess OH^-.
E) donate either OH^- or H^+.

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32) In an ionic bond, a cation is an atom that has_____ and is now positively charged.
A) lost an electron
B) gained an electron
C) lost a neutron
D) gained a neutron
E) gained a proton

33) Electrons determine the chemical behavior of atoms because
A) They have a large amount of mass relative to protons and neutrons.
B) They are the parts of atoms that come close enough to each other to interact.
C) The electrons of one atom are attracted to the electrons of other atoms.
D) There are more electrons than there are protons or neutrons.
E) All the answer choices are correct.

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FILL IN THE BLANK. Write the word or phrase that best completes each statement or answers the question.

34) The number of protons in the nucleus of an atom is called the_____.

35) If you wanted to change the mass number of an atom, you would have to alter either the number of protons or the number of _____.

36) If you were helping a professor with an experiment in which different forms of carbon were to be used, you would go to the chemical cabinet to find different _____.

37) When water ionizes, the negatively charged OH fragment is the_____ ion.

38) We use the_____ scale to measure concentrations of hydrogen ions in a solution.

39) A solution with a pH of 3 is said to be highly_____.

40) The chemical bond within a water molecule is a_____ bond.

41) Due to _____ bonding, ice is less dense than water.

42) A substance that increases the concentration of H^+ is a(n) _____.

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Answer Key

Test name: Chapter 02

1) FALSE
Buffers act to minimize changes in pH, which sometimes involves releasing hydrogen ions into solution but other times involves taking up hydrogen ions from the solution.

2) FALSE
Nonpolar molecules are hydrophobic, or "water fearing."

3) TRUE
The hydrogen bonds in water are what makes it effective in cooling organisms as they sweat.

4) FALSE
Hydrophobic molecules cannot form hydrogen bonds since they lack polar atoms.

5) FALSE
Chemicals that do not dissolve in water are hydrophobic.

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6) FALSE
Hydrogen bonds are found between water molecules.

7) FALSE
Sodium loses electrons and chlorine gains electrons. This exchange results in ionic bond formation.

8) TRUE
An ion is attracted to the electrical field contributed by all nearby ions of opposite charge so an ionic bond is not directional.

9) [B, C, D]
Because water molecules form hydrogen bonds it takes up heat when it evaporates, and it heats up more slowly than most other compounds. Hydrogen bonds between water molecules also cause ice to be less dense than liquid water.

10) A
Electrons are found outside of the nucleus. Protons and neutrons are found in the nucleus.

11) C

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Ions have gained or lost electrons.

12) D
Electrons govern interactions since they are the atomic particles which form the bonds.

13) A
Electrical neutrality means that there must be equal numbers of electrons and protons.

14) D
Electron orbitals provide a path for the electrons to travel.

15) C
Potential energy is stored in a thing which has a particular position.

16) B
For example, carbon exists in nature as a mixture of three isotopes.

17) C
Carbon-14 spontaneously breaks down, releasing radiation.

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18) D
Ionic bonds form between two ions that form from a loss or gain of electrons.

19) B
Covalent bonds involve shared electrons, even if not all atoms share equally.

20) A
Hydrogen bonds form between adjacent water molecules via the slight negative charge of oxygen and the slight positive charge of hydrogen.

21) A
pH units are logarithmic. A difference of one pH unit means a tenfold concentration difference.

22) D
Atomic number is the number of large particles in the nucleus of an atom of an element.

23) C
Atomic number is never more than mass number.

24) A

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The possible number of electrons per atom is determined by the number of protons, and the number per shell is determined by how far it is from the nucleus.

25) C
The second shell has four orbitals that hold two electrons each.

26) D
The difference between mass number and atomic number is the number of neutrons.

27) A
Hydrogen atoms in water molecules have partial positive charges.

28) C
A base will accept free H^+ in a solution and thereby raising the pH.

29) E
Adhesion is the property of water sticking to other polar substances.

30) B
Cohesion is due to water molecules sticking together as a result of hydrogen bonding.

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31) A
Antacids work by accepting excess hydrogen ions to raise the pH.

32) A
Cations have lost electrons to anions.

33) B
Electrons are on the outermost part of the atoms so they are the parts that can interact with other atoms.

34) atomic number
Atomic number is always the same as or less than atomic mass.

35) neutrons
Mass number is the sum of the numbers of protons and neutrons in an atomic nucleus.

36) isotopes
Carbon occurs in nature in three isotopes, which are forms of carbon differing in weight but not in how they form bonds.

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37) hydroxide
Besides hydroxide, water produces a proton for the other ion when it ionizes.

38) pH
pH ranges from strongly acidic to strongly basic.

39) acidic
Examples of acids include lemon juice and stomach acid.

40) covalent
Atoms within a water molecule share electrons, so the bonds formed are covalent.

41) hydrogen
Aquatic organisms in cold lakes are saved in the winter by the lower density of water ice since water ice floats, rather than sinking and freezing the entire pond from the bottom up.

42) acid
Acids release protons, lowering pH.

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