ch2

Student: _____

1. Which of the following elements would be more reactive with other elements?
   A. boron, #5
   B. neon, #10
   C. argon, #18
   D. helium, #2

2. Which of the following would be a proposed mechanism by which stomach antacids work?
   A. Antacids dilute the solution, therefore lowering the pH.
   B. Antacids are bases and by definition can absorb H^+ out of a solution.
   C. Antacids are bases and by definition can absorb OH^- out of a solution.
   D. Antacids contain mostly water and so they neutralize the solution.

3. If you place the corner of a paper towel into a droplet of water the water moves across the paper towel. Which of the following would explain the movement of the water?
   A. surface tension
   B. cohesion
   C. adhesion
   D. both cohesion and adhesion

4. Which of the following elements is NOT one of the six most common in living organisms?
   A. carbon
   B. oxygen
   C. iron
   D. nitrogen
   E. hydrogen

5. There are _____ naturally occurring elements.
   A. 57
   B. 108
   C. 95
   D. 92
   E. 87

6. Which statement is NOT true about elements?
   A. An element cannot be broken down into substances with different properties.
   B. An element consists of atoms and molecules.
   C. There is only one kind of atom in each type of element.
   D. All atoms of an element contain the same number of protons.
   E. Atoms of an element may contain different numbers of neutrons.

7. If the atomic number of an element is 6 and the atomic mass is 12.01, how many protons are there in the nucleus?
   A. 12
   B. 6
   C. 24
   D. 52

8. Which of the following is/are an atom, an isotope and an ion?
   A. H^+
   B. ^2H or deuterium
   C. ^3H or tritium
   D. H_2 or hydrogen gas
   E. All of the choices are atoms, isotopes and ions.

Radioactive Isotope	Half-life	Energy of Particles Emitted
^{131}I ("iodine-131")	8.1 days	0.8 MeV
^{32}P ("phosphorus-32")	14.3 days	1.7 MeV
^{33}P ("phosphorus-33")	25.5 days	0.25 MeV
^{35}S ("sulfur-35")	87.5 days	0.2 MeV
^{3}H ("tritium")	12.4 years	0.02 MeV
^{14}C ("carbon-14")	5730 years	0.2 MeV

9. From the above table of radioisotopes and their properties, it is obvious that
   A. the longer the half-life, the more energy emitted by the particles.
   B. the longer the half-life, the less energy emitted by the particles.
   C. radioisotopes of the same element must emit the same amount of energy in their emissions and decay at the same rate.
   D. adjusted for time, radioisotopes emit the same amount of energy in their emissions.
   E. energy and half-life are not directly related.

10. Which statement is NOT true about subatomic particles?
   A. Protons are found in the nucleus.
   B. Neutrons have no electrical charge.
   C. Electrons contain much less mass than neutrons.
   D. Electrons are found in orbitals around the nucleus.
   E. All electrons in an atom contain the same amount of energy.

11. Which is NOT true about the electrical charges in chemistry?
   A. Protons carry a positive charge.
   B. In an atom, the number of protons and neutrons must be equal.
   C. An atom is neutral when the positive and negative charges balance.
   D. An ion contains one or more positive or negative charges.

12. In a water molecule,
   A. the oxygen atom is more electronegative than the hydrogen atoms.
   B. the oxygen atom has an overall negative charge with the hydrogen atoms having an overall positive charge.
   C. unequal sharing of electrons results in a polar molecule.
   D. All of the choices are correct.

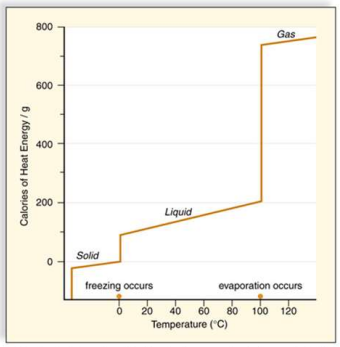
13. An atom's atomic mass is best described as the mass of
   A. the protons it contains.
   B. the neutrons it contains.
   C. electrons in the outermost shell.
   D. protons and neutrons it contains.
   E. protons and electrons it contains.

14. A research article indicates that researchers have used an isotope ^{3}H to trace a certain metabolic process. From the symbol that is given, we know this is a hydrogen isotope with
    A. three protons.
    B. three neutrons.
    C. three electrons.
    D. one proton and two neutrons.
    E. two protons and one neutron.

15. Both ^{18}O and ^{16}O are found in nature. However, ^{16}O is the most common. Therefore,
    A. these are different elements.
    B. oxygen atoms can have eight or 10 neutrons.
    C. ^{18}O has two additional electrons in its outer shell.
    D. ^{18}O is the form of oxygen that provides living cells with life.
    E. only the common form of ^{16}O can bond with hydrogen atoms to form H_2O.

16. To determine the age of fairly recent fossils and organic artifacts, it is possible to analyze the amounts of the isotopes ^{14}C and ^{14}N, because over time the ^{14}C-which originated in the atmosphere-breaks down into ^{14}N. What net change occurred for this to happen?
    A. The ^{14}C lost an electron.
    B. The ^{14}C gained an electron.
    C. The ^{14}C lost a proton.
    D. The ^{14}C gained a proton.
    E. The ^{14}C gained a neutron.

17. What does this graph reveal about the heat of vaporization and the heat of fusion?



a. Calories lost when 1 g of liquid water freezes and calories required when 1 g of liquid water evaporates.

18. Which of the following statements is NOT true about electron configurations?
    A. If an atom has only one shell, it is complete with two electrons.
    B. If an atom has two or more shells, the octet rule applies.
    C. If an atom has two or more shells, the outer shell is complete with eight electrons.
    D. Atoms with more than eight electrons in the outer shell react by gaining electrons.
    E. Atoms with eight electrons in the outer shell are not reactive at all.

19. An orbital is best described as
    A. the electron shell closest to the nucleus.
    B. the outermost electron shell of an atom.
    C. the volume of space in which electrons are most often found.
    D. the original energy level of electrons in photosynthesis.

20. Prior to prescription medications to control stomach acid and "heart burn" people consumed baking soda (sodium bicarbonate) to decrease their discomfort. This would indicate that sodium bicarbonate
    A. effectively buffers stomach acid by releasing H^+
    B. should be sold as a prescription drug
    C. blocks acid production by combining with OH^-
    D. neutralizes stomach acid by combining with excess H^+

21. Which statement is NOT true about ionic bonds?
    A. One atom acts as an electron donor and another atom acts as an electron acceptor.
    B. Electrons are completely lost or gained in ion formation.
    C. An ion has the same number of electrons as a nonionic atom of the same element.
    D. An ionic bond occurs between positive ions and negative ions.
    E. A salt such as NaCl is formed by an ionic reaction.

22. Which statement is NOT true about covalent bonds?
    A. Covalent bonds form when an electron is completely lost or gained from an atom.
    B. A covalent molecule contains one or more covalent bonds.
    C. A single covalent bond is drawn as a line between two atoms.
    D. A pair of electrons is shared between two atoms for each covalent bond.
    E. Shared electrons allow an atom to complete its outer electron shell in a covalent molecule.

23. Which statement is NOT true about polar covalent bonds?
    A. Most covalent bonds are nonpolar, with electrons shared fairly equally between the atoms.
    B. Polar covalent bonds are important in the characteristics of water.
    C. Electrons are shared unequally in a polar covalent bond.
    D. The larger atom in a polar bond attracts the electron more strongly than the smaller atom.
    E. The oxygen of a water molecule is electropositive relative to the hydrogen.

24. An abandoned Indiana coal mine spoil bank contains chunks of pyrite minerals. Under constant erosion and weathering, the pyrites leech large amounts of sulfuric acid (H_2SO_4). The spoil banks are also mixed with large quantities of basic limestone and clay carbonates. What should occur over time?
    A. The pH level will drop until all acid has washed out.
    B. The pH level will remain at 7.0 because of constant washing with rain.
    C. The pH level will remain at 7.0 because all acid will be immediately neutralized by bases.
    D. The pH levels will be spotty and vary over time, first more acidic but drifting back toward 7.0.
    E. Bases always dominate over acids.

Which of the following statements is/are true about the pH scale?

25. The scale indicates the relative concentrations of hydrogen and hydroxyl ions in a solution.
    True False

26. The scale ranges from 1 to 15.
    True False

27. pH 7 has a balanced level of H^+ and OH^-.
    True False

28. Anything below pH 7 is acidic and above pH 7 is basic.
    True False

29. A change of one pH unit represents a ten-fold increase or decrease in hydroxyl ion concentration.
    True False