

## SAT Chemistry Practice Test 10

### The Periodic Table and Periodic Trends

1. The modern periodic table is arranged based upon atomic
  - A. isotopes
  - B. number
  - C. density
  - D. radius
  - E. mass
2. In period 3 of the periodic table the atom with the largest atomic radius is located in group
  - A. 1
  - B. 3
  - C. 13
  - D. 17
  - E. 18
3. The elements that display the greatest nonmetallic character are located toward which corner of the periodic table?
  - A. Upper left
  - B. Dead center
  - C. Lower right
  - D. Lower left
  - E. Upper right
4. Which two elements will display the most similar chemical properties?
  - A. Aluminum and calcium
  - B. Nickel and phosphorus
  - C. Chlorine and sulfur
  - D. Carbon and sulfur
  - E. Lithium and potassium

5. Assuming the ground state, all of the elements located in group 13 of the periodic table will have the same number of

- A. nuclear particles
- B. occupied principal energy levels
- C. electrons
- D. valence electrons
- E. neutrons

6. Which group contains elements in the solid, liquid, and gas phases at 298 K and 1 atm?

- A. 1
- B. 2
- C. 16
- D. 17
- E. 18

7. An element that has high first ionization energy and is chemically inactive would most likely be

- A. a noble gas
- B. a transition element
- C. an alkali metal
- D. a halogen
- E. an alkaline earth metal

8. Which salt solution is most likely to be colored?

- A.  $\text{KClO}_3$  (aq)
- B.  $\text{KNO}_3$  (aq)
- C.  $\text{K}_2\text{CrO}_4$  (aq)
- D.  $\text{K}_2\text{SO}_4$  (aq)
- E.  $\text{KCl}$  (aq)

9. As the elements of period 2 are considered from left to right, there is generally a decrease in

- A. ionization energy
- B. electronegativity
- C. metallic character

D. nonmetallic character

E. none of the above

10. Which element is a liquid at room temperature?

A. K

B. Hg

C. I<sub>2</sub>

D. Mg

E. Kr

11. At STP, which element is most expected to exist as a monatomic gas?

A. Calcium

B. Hydrogen

C. Nitrogen

D. Neon

E. Bromine

12. Nonmetals are poor conductors of heat and they also tend to

A. be brittle

B. conduct an electrical current

C. have a shiny luster

D. be malleable

E. lose electrons

13. Which statement does not explain why elements in a group are placed together?

A. They tend to have the same number of valence electrons.

B. They tend to have a similar oxidation number.

C. They tend to have the same electronegativities.

D. They tend to have the same chemical reactivity.

E. They tend to have the same charge when they form ions.

## **Bonding**

1. Which substance has a polar covalent bond between its atoms?

- A.  $K_3N$
- B.  $Ca_3N_2$
- C.  $NaCl$
- D.  $F_2$
- E.  $NH_3$

2. Which kinds of bonding can be found in a sample of  $H_2O(l)$ ?

- A. Hydrogen bonds only
- B. Nonpolar covalent bonds only
- C. Ionic and nonpolar hydrogen bonds
- D. Both polar covalent and hydrogen bonds
- E. Metallic and ionic bonds

3. When an ionic compound is dissolved in water, the ions in solution can best be described as

- A. hydrated molecules only
- B. dehydrated ions and molecules
- C. both hydrated molecules and hydrated ions
- D. neither hydrated ions nor hydrated molecules
- E. hydrated ions only

4. Which substance represents a molecule that can combine with a proton ( $H^+$ )?

- A.  $NH_3$
- B.  $Na^+$
- C.  $HCl$
- D.  $H_3O^+$
- E.  $H$

5. Which compound contains no ionic character?

- A.  $NH_4Cl$
- B.  $CaO$
- C.  $K_2O$

D.  $\text{Li}_2\text{O}$

E.  $\text{CO}$

**6.** The forces of attraction that exist between nonpolar molecules are called

A. Van der Waals / dispersion forces

B. ionic bonds

C. covalent bonds

D. electrovalent bonds

E. metallic bonds

**7.** Which substance is a network solid?

A.  $\text{Li}_2\text{O}$

B.  $\text{SiO}_2$

C.  $\text{H}_2\text{O}$

D.  $\text{CO}_2$

E.  $\text{NaCl}$

**8.** Which molecule is a polar molecule?

A.  $\text{N}_2$

B.  $\text{H}_2\text{O}$

C.  $\text{CH}_4$

D.  $\text{CO}_2$

E.  $\text{KCl}$

**9.** Which is the chemical formula for iron(III) sulfate?

A.  $\text{Fe}_2\text{SO}_4$

B.  $\text{Fe}_3\text{SO}_4$

C.  $\text{Fe}(\text{SO}_4)_3$

D.  $\text{Fe}_2(\text{SO}_4)_3$

E.  $\text{Fe}_2\text{S}_3$

**10.** In which of the following compounds are hydrogen bonds between molecules the strongest?

A.  $\text{HF}$

B. HCl

C. HBr

D. HI

E. HAt

**11.** When a salt dissolves in water, the water molecules are attracted by ions in the solution. This attraction is called

A. atom-atom

B. molecule-molecule

C. molecule-ion

D. ion-ion

E. atom-ion

**12.** Which element is expected to have a “sea” of electrons?

A. Hydrogen

B. Nitrogen

C. Cobalt

D. Chlorine

E. Oceanium

**13.** In which of the following liquids are the Van der Waals forces of attraction between the molecules weakest?

A. Xe

B. Kr

C. Ar

D. Ne

E. He

**14.** Which molecule has both nonpolar intramolecular and nonpolar intermolecular bonds?

A. CCl<sub>4</sub>

B. CO

C. HF

D. HCl

E.  $F_2$

**15.** The name of the compound  $MgBr_2$  is

A. manganese bromite

B. manganese bromide

C. magnesium bromite

D. magnesium bromide

E. magnesium dibromide

**16.** The anion  $S^{2-}$  is called

A. sulfide

B. sulfite

C. sulfurous

D. sulfur

E. sulfate

**17.** The compound  $PF_5$  is called

A. monophorofluoride

B. phosphorus pentafluoride

C. pentaphosphoro fluoride

D. phosphorus tetrafluoride

E. potassium pentafluoride

**18.** Element X forms the compounds  $XCl_3$  and  $X_2O_3$ . Element X would most likely belong to the group called

A. alkali metals

B. alkaline earth metals

C. group 13

D. halogens

E. noble gases

**19.** When oxygen reacts with an alkali metal the general formula of the compound will be

A.  $MO_2$

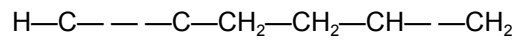
B.  $M_2O$

C.  $M_2O_3$

D.  $M_3O_2$

E. MO

**20.** How many sigma and pi bonds are found in the following molecule?



A. There are 3 pi bonds and 13 sigma bonds.

B. There are 12 sigma bonds and 5 pi bonds.

C. There are 12 sigma bonds and 2 pi bonds.

D. There are 2 pi bonds and 4 sigma bonds.

E. There are 8 sigma bonds and 2 pi bonds.