

**AP Chem Chapter 7: Periodic Properties of the Elements. Worksheet #1****Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- Elements in the modern version of the periodic table are arranged in order of increasing \_\_\_\_\_.  
(A) oxidation number  
(B) atomic mass  
(C) average atomic mass  
(D) atomic number  
(E) number of isotopes
- An electron in a(n) \_\_\_\_\_ subshell experiences the greatest effective nuclear charge in a many-electron atom.  
(A) 3f  
(B) 3p  
(C) 3d  
(D) 3s  
(E) 4s
- A tin atom has 50 electrons. Electrons in the \_\_\_\_\_ subshell experience the lowest effective nuclear charge.  
(A) 1s  
(B) 3p  
(C) 3d  
(D) 5s  
(E) 5p
- The first ionization energies of the elements \_\_\_\_\_ as you go from left to right across a period of the periodic table, and \_\_\_\_\_ as you go from the bottom to the top of a group in the table.  
(A) increase, increase  
(B) increase, decrease  
(C) decrease, increase  
(D) decrease, decrease  
(E) are completely unpredictable
- The \_\_\_\_\_ have the most negative electron affinities.  
(A) alkaline earth metals  
(B) alkali metals  
(C) halogens  
(D) transition metals  
(E) chalcogens
- In general, as you go across a period in the periodic table from left to right:  
(1) the atomic radius \_\_\_\_\_;  
(2) the electron affinity becomes \_\_\_\_\_ negative; and  
(3) the first ionization energy \_\_\_\_\_.  
(A) decreases, decreasingly, increases  
(B) increases, increasingly, decreases  
(C) increases, increasingly, increases  
(D) decreases, increasingly, increases  
(E) decreases, increasingly, decreases
- Element M reacts with chlorine to form a compound with the formula  $MCl_2$ . Element M is more reactive than magnesium and has a smaller radius than barium. This element is \_\_\_\_\_.  
(A) Sr  
(B) K  
(C) Na  
(D) Ra  
(E) Be
- The oxide of which element below can react with hydrochloric acid?  
(A) sulfur  
(B) selenium  
(C) nitrogen  
(D) sodium  
(E) carbon

- 9) Metals can be \_\_\_\_\_ at room temperature.
- (A) liquid only
  - (B) solid only
  - (C) solid or liquid
  - (D) solid, liquid, or gas
  - (E) liquid or gas
- 10) Most of the elements on the periodic table are \_\_\_\_\_.
- (A) gases
  - (B) nonmetals
  - (C) metalloids
  - (D) liquids
  - (E) metals
- 11) Na reacts with element X to form an ionic compound with the formula  $\text{Na}_3\text{X}$ . Ca will react with X to form \_\_\_\_\_.
- (A)  $\text{CaX}_2$
  - (B)  $\text{CaX}$
  - (C)  $\text{Ca}_2\text{X}_3$
  - (D)  $\text{Ca}_3\text{X}_2$
  - (E)  $\text{Ca}_3\text{X}$
- 12) What is the coefficient of M when the following equation is completed and balanced if M is an alkali metal?
- $$\text{M (s)} + \text{H}_2\text{O (l)} \rightarrow$$
- (A) 1
  - (B) 2
  - (C) 3
  - (D) 4
  - (E) 0
- 13) Which alkaline earth metal will not react with liquid water or with steam?
- (A) Be
  - (B) Mg
  - (C) Ca
  - (D) Ba
  - (E) They all react with liquid water and with steam.
- 14) Oxides of the active metals combine with water to form \_\_\_\_\_.
- (A) metal hydroxides
  - (B) metal hydrides
  - (C) hydrogen gas
  - (D) oxygen gas
  - (E) water and a salt
- 15) Oxides of the active metals combine with acid to form \_\_\_\_\_.
- (A) hydrogen gas
  - (B) metal hydrides
  - (C) water and a salt
  - (D) oxygen gas
  - (E) metal hydroxides
- 16) Oxides of most nonmetals combine with water to form \_\_\_\_\_.
- (A) an acid
  - (B) a base
  - (C) water and a salt
  - (D) water
  - (E) hydrogen gas
- 17) An alkaline earth metal forms a compound with oxygen with the formula \_\_\_\_\_. (The symbol M represents any one of the alkaline earth metals.)
- (A)  $\text{MO}$
  - (B)  $\text{M}_2\text{O}$
  - (C)  $\text{MO}_2$
  - (D)  $\text{M}_2\text{O}_2$
  - (E)  $\text{MO}_3$
- 18) The reaction of a metal with a nonmetal produces a(n) \_\_\_\_\_.
- (A) base
  - (B) salt
  - (C) acid
  - (D) oxide
  - (E) hydroxide
- 19) Which nonmetal exists as a diatomic solid?
- (A) bromine
  - (B) antimony
  - (C) phosphorus
  - (D) iodine
  - (E) boron

- 20) Which group 6A element is a metal?  
Ⓐ tellurium and polonium  
Ⓑ sulfur  
Ⓒ selenium  
Ⓓ tellurium  
Ⓔ polonium
- 21) The most common sulfur ion has a charge of \_\_\_\_\_.  
Ⓐ 2-  
Ⓑ 1-  
Ⓒ 4+  
Ⓓ 6+  
Ⓔ Sulfur does not form ions.
- 22) The element phosphorus exists in two forms in nature called white phosphorus and red phosphorus. These two forms are examples of \_\_\_\_\_.  
Ⓐ isotopes  
Ⓑ allotropes  
Ⓒ oxidation  
Ⓓ metalloids  
Ⓔ noble gases
- 23) Which periodic table group contains only nonmetals?  
Ⓐ 8A  
Ⓑ 2A  
Ⓒ 6A  
Ⓓ 7A  
Ⓔ 5A
- 24) Of the hydrogen halides, only \_\_\_\_\_ is a weak acid.  
Ⓐ HCl (aq)  
Ⓑ HBr (aq)  
Ⓒ HF (aq)  
Ⓓ HI (aq)  
Ⓔ They are all weak acids.
- 25) All the elements in group 8A are gases at room temperature. Of all the groups in the periodic table, only group \_\_\_\_\_ contains examples of elements that are gas, liquid, and solid at room temperature.  
Ⓐ 2A  
Ⓑ 1A  
Ⓒ 7A  
Ⓓ 5A  
Ⓔ 6A
- 26) The only noble gas that does not have the  $ns^2np^6$  valence electron configuration is \_\_\_\_\_.  
Ⓐ radon  
Ⓑ neon  
Ⓒ helium  
Ⓓ krypton  
Ⓔ All noble gases have the  $ns^2np^6$  valence electron configuration.
- 27) The first noble gas to be incorporated into a compound was \_\_\_\_\_.  
Ⓐ Ar  
Ⓑ Kr  
Ⓒ He  
Ⓓ Ne  
Ⓔ Xe
- 28)  $\text{Cl}_2 (\text{g}) + \text{H}_2\text{O} (\text{l}) \rightarrow$  \_\_\_\_\_  
Ⓐ  $\text{HCl} (\text{aq}) + \text{HOCl} (\text{aq})$   
Ⓑ  $2 \text{Cl}^- (\text{aq}) + \text{H}_2\text{O} (\text{l})$   
Ⓒ  $2 \text{HCl} (\text{aq}) + \text{O}_2 (\text{g})$   
Ⓓ  $2 \text{HCl} (\text{aq}) + \text{O}_2^- (\text{g})$   
Ⓔ  $\text{Cl}_2 (\text{aq}) + \text{H}_2\text{O} (\text{l})$
- 29) Which element would be expected to have chemical and physical properties closest to those of fluorine?  
Ⓐ S  
Ⓑ Fe  
Ⓒ Ne  
Ⓓ O  
Ⓔ Cl