

Please read all the questions VERY carefully before answering. No outside paper is allowed.  
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) What is the oxygen-to-sulfur mass ratio of sulfur dioxide?

1) \_\_\_\_\_

- A) 0.5
- B) 1.0
- C) 2.0
- D) 16
- E) none of the above

2) How many of each type of atoms are there in the formula  $\text{NH}_4\text{C}_2\text{H}_3\text{O}_2$ ?

2) \_\_\_\_\_

- A) N = 1, H = 7, C = 2, O = 2
- B) N = 4, H = 7, C = 2, O = 2
- C) N = 1, H = 4, C = 2, O = 2
- D) N = 1, H = 3, C = 2, O = 2
- E) none of the above

3) Which among the following elements does not exist as a diatomic molecule in nature?

3) \_\_\_\_\_

- A) Neon
- B) Nitrogen
- C) Hydrogen
- D) Fluorine
- E) none of the above

4) Ammonium fluoride is considered which of the following?

4) \_\_\_\_\_

- A) ionic compound
- B) atomic element
- C) molecular element
- D) molecular compound
- E) none of the above

5) What is the name of the ionic compound made of beryllium and chlorine?

5) \_\_\_\_\_

- A) beryllium(II) chloride
- B) beryllium chloride
- C) monoberyllium dichloride
- D) beryllium dichloride
- E) none of the above

6) What is the name of  $\text{CoS}$ ?

6) \_\_\_\_\_

- A) Cobalt sulfide
- B) Cobalt(II) sulfide
- C) Cobalt monosulfide
- D) Cobaltous sulfur
- E) none of the above

7) Choose the pair of names and formulas that do not match.

7) \_\_\_\_\_

- A) Aluminum sulfate:  $(\text{NH}_4)_2\text{SO}_4$
- B) Sodium hydrogen carbonate:  $\text{NaHCO}_3$
- C) Potassium hydroxide:  $\text{KOH}$
- D) Magnesium nitrite:  $\text{Mg}(\text{NO}_2)_3$
- E) Calcium carbonate:  $\text{CaCO}_3$

8) What is the correct formula for ammonium hydrogen sulfate?

8) \_\_\_\_\_

- A)  $\text{NH}_4\text{HSO}_4$
- B)  $\text{Am}_2\text{HSO}_4$
- C)  $(\text{NH}_4)_2\text{HSO}_4$
- D)  $\text{NH}_4)_2\text{SO}_4$
- E) none of the above

9) The formula for potassium chlorate is  $\text{KClO}_3$ . The formula for magnesium chloride is  $\text{MgCl}_2$ .

9) \_\_\_\_\_

What is the formula for magnesium chlorate?

- A)  $\text{MgClO}_3$
- B)  $\text{Mg}(\text{ClO}_3)_2$
- C)  $\text{Mg}_2\text{ClO}_3$
- D)  $\text{Mg}_2(\text{ClO}_3)_3$
- E) none of the above

10) What is the correct formula for the molecular compound heptaphosphorus octafluoride?

10) \_\_\_\_\_

- A)  $\text{P}_7\text{F}_8$
- B)  $\text{P}_7\text{F}_6$
- C)  $\text{P}_5\text{F}_8$
- D)  $\text{P}_6\text{F}_7$
- E) none of the above

11) What is the name of  $\text{HIO}_3$ ?

11) \_\_\_\_\_

- A) hydroiodic acid
- B) iodic acid
- C) hydroiodous acid
- D) iodous acid
- E) none of the above

12) What is the formula mass for diboron tetrachloride?

12) \_\_\_\_\_

- A) 234.34 amu
- B) 198.89 amu
- C) 163.43 amu
- D) 127.98 amu
- E) none of the above

13) What is mass of 0.560 moles of chlorine gas?

13) \_\_\_\_\_

- A) 19.9
- B) 63.3
- C) 39.7
- D) 127
- E) none of the above

14) What is the mass of  $1.56 \times 10^{21}$  atoms of magnesium in grams?

14) \_\_\_\_\_

- A) 0.0630
- B)  $1.07 \times 10^{-4}$
- C)  $4.72 \times 10^{-5}$
- D) 0.142
- E) none of the above

15) What is the molar mass of aluminum sulfate?

15) \_\_\_\_\_

- A) 306.2 g/mol
- B) 342.2 g/mol
- C) 278.0 g/mol
- D) 123.0 g/mol
- E) 315.2 g/mol

16) A 42.7 gram sample of potassium nitrate contains how many grams of potassium?

16) \_\_\_\_\_

- A) 8.54
- B) 16.5
- C) 39.1
- D) 21.4
- E) none of the above

17) What is the mass percent of carbon in oxalic acid,  $\text{H}_2\text{C}_2\text{O}_4$ ?

17) \_\_\_\_\_

- A) 34.5
- B) 2.24
- C) 13.3
- D) 26.7
- E) none of the above

18) Determine the empirical formula of a compound containing 83% potassium and 17.0% oxygen.

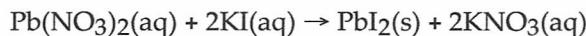
18) \_\_\_\_\_

- A)  $\text{K}_2\text{O}_3$
- B) KO
- C) KO<sub>2</sub>
- D) K<sub>2</sub>O
- E) none of the above

- 19) A compound has a molar mass of 180.15 g/mol. Given the following percent composition, calculate the molecular formula: 40% C, 6.7% H, 53.3% O      19) \_\_\_\_\_
- A)  $C_6H_{12}O_6$   
B)  $CH_3O_2$   
C)  $CH_2O$   
D)  $C_3H_6O_3$   
E) none of the above
- 20) When the equation,  $\underline{\quad}N_2 + \underline{\quad}H_2 \rightarrow \underline{\quad}NH_3$  is balanced, the coefficient of hydrogen is      20) \_\_\_\_\_
- A) 2  
B) 4  
C) 1  
D) 3  
E) none of the above
- 21) What are the coefficients for the following reaction when it is properly balanced?      21) \_\_\_\_\_
- $\underline{\quad}$ nitrogen monoxide +  $\underline{\quad}$ carbon monoxide  $\rightarrow \underline{\quad}$ nitrogen +  $\underline{\quad}$ carbon dioxide
- A) 2, 1, 1, 2  
B) 1, 1, 2, 2  
C) 2, 2, 1, 2  
D) 2, 2, 2, 1  
E) none of the above
- 22) Which of the following compounds is INSOLUBLE?      22) \_\_\_\_\_
- A) lithium carbonate  
B) magnesium bromide  
C) aluminum sulfide  
D) potassium acetate  
E) none of the above
- 23) What type of a reaction occurs when a potassium nitrate solution is mixed with a barium acetate solution?      23) \_\_\_\_\_
- A) precipitation  
B) acid-base neutralization  
C) gas evolution  
D) oxidation-reduction  
E) no reaction
- 24) What is the molecular equation for the reaction of hydrochloric acid with potassium hydroxide?      24) \_\_\_\_\_
- A)  $HCl + KOH \rightarrow H_2O + KCl$   
B)  $H_2Cl + 2KOH \rightarrow H_2O + 2KCl$   
C)  $H^+ + OH^- \rightarrow H_2O$   
D)  $2HCl + K(OH)_2 \rightarrow 2H_2O + KCl_2$   
E) none of the above

25) Considering the following precipitation reaction:

25) \_\_\_\_\_



What is the correct net ionic equation?

- A)  $\text{Pb}^{2+} + \text{I}_2^- \rightarrow \text{PbI}_2(\text{s})$
- B)  $\text{Pb}^{2+} + 2\text{I}^- \rightarrow \text{PbI}_2(\text{s})$
- C)  $2\text{NO}_3^- + 2\text{K}^+ \rightarrow 2\text{KNO}_3$
- D)  $\text{Pb}^{2+} + 2\text{NO}_3^- + 2\text{K}^+ + 2\text{I}^- \rightarrow \text{PbI}_2(\text{s}) + 2\text{K}^+ + 2\text{NO}_3^-$
- E) none of the above

26) What type of reaction is the generic equation  $\text{AB} + \text{CD} \rightarrow \text{AD} + \text{CB}$  ?

26) \_\_\_\_\_

- A) decomposition
- B) synthesis/combination
- C) displacement
- D) double-displacement
- E) none of the above

27) The atomic mass unit is defined as:

27) \_\_\_\_\_

- A) the mass of electrons found in a carbon atom containing six protons and neutrons.
- B)  $1/14$  the mass of a nitrogen atom containing 7 protons and 7 neutrons.
- C)  $1/12$  the mass of a carbon atom containing six protons and six neutrons.
- D) the mass of the hydrogen atom containing only one proton.
- E) none of the above

28) The names of the elements whose symbols are Si, P, Mn, and S are respectively,

28) \_\_\_\_\_

- A) silicon, phosphorus, manganese, and sulfur.
- B) silicon, phosphorus, magnesium, and sulfur.
- C) silicon, potassium, magnesium, and sulfur.
- D) silicon, potassium, magnesium, and sodium.
- E) silver, phosphorus, magnesium, and sulfur.

29) Group 1A elements are also called:

29) \_\_\_\_\_

- A) noble gases.
- B) alkaline earth metals.
- C) halogens.
- D) alkali metals.
- E) none of the above

30) Cr is a member of which family?

30) \_\_\_\_\_

- A) halogens
- B) alkaline earth metals
- C) alkali metals
- D) noble gases
- E) none of the above

31) Which of the following statements about ions is INCORRECT?

- A) Cations are positive ions and anions are negative ions.
- B) Anions are formed when an atom gains electrons.
- C) Cations are formed when an atom gains protons.
- D) Cations are formed when an atom loses electrons.
- E) All statements are correct.

31) \_\_\_\_\_

32) What is the charge on the ion formed by selenium?

- A) 2+
- B) 1-
- C) 2-
- D) 1+
- E) none of the above

32) \_\_\_\_\_

33) Isotopes are:

- A) atoms of the same element that have different number of protons.
- B) atoms of the same element that have the same number of neutrons.
- C) atoms of the same element that have different number of electrons.
- D) atoms of the same element that have different number of neutrons.
- E) none of the above

33) \_\_\_\_\_

34) An atom that has the same number of neutrons as  $^{138}_{56}\text{Ba}$  is

34) \_\_\_\_\_

- A)  $^{138}_{55}\text{Cs}$
- B)  $^{136}_{54}\text{Am}$
- C)  $^{136}_{56}\text{Ba}$
- D)  $^{137}_{57}\text{La}$
- E) none of the above

35) Chlorine has two stable isotopes, Cl-35 and Cl-37. If their exact masses are 34.9689 amu and 36.9695 amu, respectively, what is the natural abundance of Cl-35? (The atomic mass of chlorine is 35.45 amu)

35) \_\_\_\_\_

- A) 35.00%
- B) 37.00%
- C) 24.05%
- D) 75.95%
- E) 50.00%

36) How many protons and electrons are present in O<sup>2-</sup>?

36) \_\_\_\_\_

- A) 10 protons and 8 electrons.
- B) 16 protons and 8 electrons.
- C) 8 protons and 8 electrons.
- D) 8 protons and 10 electrons.
- E) none of the above

**TRUE/FALSE. Choose "A" for a true answer and "B" for wrong answer.**

37) Halogens form anions with a 1- charge.

37) \_\_\_\_\_

- 38)  $\text{SO}_2$  is an ionic compound. 38) \_\_\_\_\_
- 39)  $\text{Cl}^-$ ,  $\text{Br}^-$ , and  $\text{I}^-$  are mostly insoluble. 39) \_\_\_\_\_
- 40) A spectator ion is one that does not actively participate in a chemical reaction. 40) \_\_\_\_\_

## Answer Key

Testname: FH\_CHEM25\_SP08\_LECTEST2

- 1) B
- 2) A
- 3) A
- 4) A
- 5) B
- 6) B
- 7) D
- 8) A
- 9) B
- 10) A
- 11) B
- 12) C
- 13) C
- 14) A
- 15) B
- 16) B
- 17) D
- 18) D
- 19) A
- 20) D
- 21) C
- 22) C
- 23) E
- 24) A
- 25) B
- 26) D
- 27) C
- 28) A
- 29) D
- 30) E
- 31) C
- 32) C
- 33) D
- 34) B
- 35) D
- 36) D
- 37) TRUE
- 38) FALSE
- 39) FALSE
- 40) TRUE