Introduction To Chemistry (CHEM 101)

Second test

Chapters 3&4

1- Which is the correct empirical formula for the compound $C_2H_4O_2$?

A) CHO **B) CH_2O** C) $C_2H_2O_2$ D) $C_2H_4O_2$

2- Identify the type of the substance CO

A) atomic element

B) ionic compound

C) molecular compound

D) molecular element

3- What is systematic name of $Cu_3(PO_4)_2$

A) tricopper diphosphate

B) copper(II) phosphate

C) copper(I) phosphorus oxide

D) copper(II) phosphide

4- What is the systematic name for the compound CCl_4?

A) monocarbon tetrachloride

B) carbon tetrachloride

C) tetrachloride carbon

D) carbon trichloride

5- Choose the right formula for ammonium sulfate:

A) $SO_4(NH_4)_2$ **B)** $\mathbf{(NH_4)_2SO_4}$ C) NH_4SO_4 D) $(NH_4)_2SO_3$

6- Indicate the correct formula for sulfite ion:

A) S^{2-} B) SO_4^{2-} **C)** $\mathbf{SO_3^{2-}}$ D) SO_3^{1-}

7- Name the compound $HBr_{(aq)}$.

A) hydrogen monobromide

B) hydrobromine acid

C) hydrogen monobromic acid

D) hydrobromic acid

8- Calculate the molar mass of the compound $(NH_4)_3PO_4$

A) 149 g/mol B) 84 g/mol C) 113 g/mol D) 203 g/mol

9- How many moles of $(NH_4)_2S$ are there in 34 g of $(NH_4)_2S$?

A) 0.3 mol **B) 0.5 mol** C) 1.2 mol D) 2.3 mol

10- How many moles and how many atoms of Rb are in a sample weighing 30 g?

A) 0.53 mol , 1.14×10^{24} atoms

B) 1.12 mol , 1.12×10^{23} atoms

C) 3.51 mol , 3.20×10^{23} atoms

D) 0.35 mol , 2.10×10^{23} atoms

11- How many molecules are there in 110 g of chlorine gas?

A) 2.32×10^{24} molecules

B) 9.34×10^{23} molecules

C) 7.12×10^{23} molecules

D) 4.42×10^{23} molecules

12- Calculate the mass percent of oxygen in $Fe(OH)_3$

A) 66 % **B) 45 %** C) 52 % D) 16 %

13- A sample containing 21.96% S and 78.04% F. What is its empirical formula?

A) SF B) SF_2 C) SF_4 **D)** SF_6

14- A compound is found to contain 50.05% sulfur and 49.95% oxygen by weight. What is the empirical formula for this compound?

A) SO_3 **B) SO_2** C) SO D) S_6O_2

15- A compound has a molar mass of 515.43 g/mol. What is the molecular formula of this compound if its empirical formula is CBr_2?

A) CBr_4 B) C_4Br_8 **C) C_3Br_6** D) C_2Br_4

16- When the following equation is balanced, the coefficient of H_2O equals _____.

$$SnO_2 + H_2 \rightarrow Sn + H_2O$$

A) 1 **B) 2** C) 3 D) 4

17- Which set of coefficients will make the following equation properly balanced?

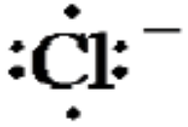
$$\_\_\_\ Fe + \_\_\_\ O_2 \rightarrow \_\_\_\ Fe_2O_3$$

A) 4 , 3 , 2 B) 2 , 3 , 4 C) 3 , 2 , 1 D) 4 , 2 , 3

18- Which of these substances is formed by transferring electrons between atoms?

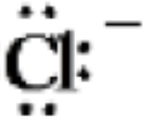
A) FeF_2 **(*s*)** B) CCl_4 (*g*) C) SO_3 (*g*) D) Mg (s)

19- The Lewis dot symbol for the Cl^- is _____.

A) 

B) 

C)

D) 

20- How many lone pairs and bonding pairs of electrons are there in N_2 molecule?

A) 4 lone pairs, 6 bonding pairs

B) 3 lone pairs, 2 bonding pairs

C) 2 lone pairs, 3 bonding pairs

D) 0 lone pairs, 3 bonding pairs

21- Which bond is formed as a result of unequal sharing of electrons between two different atoms?

A) ionic B) pure covalent **C) polar covalent** D) metallic

22- Which of the following bonds is short and strong?

A) C=C **B) C≡C** C) C–H D) C–C

23- How many moles of NO_2 will be formed when 15 moles of N_2O_5 completely dissociate?

$$2\ N_2O_5(g) \rightarrow 4\ NO_2(g) + O_2(g)$$

A) 30 B) 15 C) 60 D) 8

24- Calculate the theoretical yield (in moles) for NO, when 5 moles of NH_3 react with 4 moles of O_2, according to the following balanced equation:

$$4\,NH_3 + 5\,O_2 \rightarrow 4\,NO + 6\,H_2O$$

A) 3.2 mol B) 5.0 mol C) 2.3 mol D) 4.2 mol

25- What is the percent yield for a reaction if its theoretical yield is 123 g and its actual yield is 95 g?

A) 103.1 % B) 56.9 % C) 92.1 % **D) 77.2 %**

26- What is the molarity of a solution if 3.4 moles of NaBr are dissolved in water to make a 1.8 L solution?

A) 2.5 M **B) 1.89 M** C) 4.4 M D) 3.1 M

27- What is the molarity of KCl solution prepared by diluting 300.0 mL of 3.00 M HCl to a total volume of 1.2 L?

A) 0.43 M B) 3.12 M **C) 0.75 M** D) 1.21 M

28- The number of grams required to make 430 mL of a 1.5 M NaCl solution is __ g.

A) 0.645 **B) 37.7** C) 3.77 D) 645

29- What is the oxidation number of Cr in $Cr_2O_7^{-2}$?

A) +2 B) +4 C) +5 **D) +6**

30- In the following reaction, identify the element that is oxidized:

$$Pb(NO_3)_2(aq) + Na_2SO_4(aq) \rightarrow PbSO_4(s) + 2\ NaNO_3(aq)$$

A) Pb B) N C) S **D) None**

31- Identify the oxidizing agent in the following redox reaction:

$$Sn(s) + 2H^+(aq) \rightarrow Sn^{2+}(aq) + H_2(g)$$

A) Sn B) Sn^{2+} C) H^+ D) H_2

32- Which of the following gives the strongest electrolyte when dissolved in water?

A) HF **B) Na_2CO_3** C) NH_3 D) $C_6H_{12}O_6$