Worksheet 12 – CHEM 121 – Fall 2015

Monday Name: ____________________________

Wednesday Name: __________________________

Directions: First 40 minutes with partner, non-programmable calculator; no notes – next 10 minutes with notes – remaining 25 minutes at the board.

1) \(5 \times 10^{22}\) atoms of \(\text{Li}_2\text{CO}_3\) are how many moles of \(\text{Li}_2\text{CO}_3\)?

2) \(7 \times 10^{23}\) atoms of \(\text{SrCl}_2\) are how many mols of \(\text{SrCl}_2\)?

3) \(4 \times 10^{20}\) atoms of \(\text{Li}_2\text{CO}_3\) are how many grams of \(\text{Li}_2\text{CO}_3\)?
4) Determine the % composition of Li in Li$_3$C$_6$H$_5$O$_7$.

5) Determine the % composition of Ca in CaSO$_4$·4H$_2$O.

6) Determine the % composition of Mg in MgNH$_4$PO$_4$. 
7) Determine the % composition of H in MgNH4PO4.

8) Determine the % composition of Cu in Cu3(AsO4)2·Cu(C2H3O2)2.

9) 98 g H2SO4 are dissolved in 0.5 L H2O. What is the resulting molarity of the solution?

10) 80 g NaOH are dissolved in 250 mL H2O. What is the molarity of the solution?
11) 9.125 g HCl are dissolved in 300 mL H₂O. What is the molarity of the solution?

12) How many grams of Al(OH)₃ are required to make a solution 0.25 M in 500 mL of solution?

13) 31.5 g HNO₃ are dissolved in 1 L H₂O. What is the molarity of the solution?

14) For the reaction SrCO₃ + 2HCl → SrCl₂ + CO₂↑ + H₂O, how many grams of SrCl₂ are produced when 5 mL of 4 M SrCO₃ are reacted with HCl?
15) For the reaction $2\text{HCl} + \text{CaCO}_3 \rightarrow \text{CaCl}_2 + \text{CO}_2\uparrow + \text{H}_2\text{O}$, how many grams $\text{CaCl}_2$ are produced when 45 mL 0.34 M CaCO$_3$ react with the HCl?

16) For the reaction $\text{NaHCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{NaC}_2\text{H}_3\text{O}_2 + \text{CO}_2\uparrow + \text{H}_2\text{O}$, how many mL of 0.5 M HC$_2$H$_3$O$_2$ are required to react with 10 g NaHCO$_3$?

17) How many mL of 0.33 M HNO$_3$ are required to react with 15 g AgCl as follows: $\text{HNO}_3 + \text{AgCl} \rightarrow \text{AgNO}_3 + \text{HCl}$?
18) For the following reaction: \( N_2 + 3I_2 \rightarrow 2NI_3 \), if you start with 25 g \( I_2 \) and you obtain 15 g \( NI_3 \), what is the per cent yield of \( NI_3 \)?

19) For the following reaction: \( 2Na + 2H_2O \rightarrow 2NaOH + H_2 \uparrow \), if you start with 10 g \( Na \) and you obtain 8 g \( NaOH \), what is the per cent yield of \( NaOH \)?

20) For the following reaction: \( CO_2 + NH_3 \rightarrow CH_3N_2O \) (urea) + \( H_2O \), if you start with 6 g \( CO_2 \) and obtain 5 g urea, what is the per cent yield of urea?
21) If 2 mol HCl reacts with AgNO₃ as follows: HCl + AgNO₃ → AgCl + HNO₃, how many mol AgCl are produced?

22) If 36.5 g HCl reacts with AgNO₃ as above, how many grams of AgCl will be produced?

23) If you also have 10 g AgNO₃ for the above two questions, which reagent is the limiting reagent?
24) Given the following reaction: \( \text{N}_2 + 3\text{I}_2 \rightarrow 2\text{NI}_3 \), if you have 28 g \( \text{N}_2 \), how many grams of \( \text{NI}_3 \) will you be able to make?

25) If you also have 50 g \( \text{I}_2 \) for the above reaction in #24, what is the limiting reagent?