NAME_____

F2014/ CHEM1301/Exam 4

11/7/14

Multiple Choice: (4 Points each) Write the letter associated with the correct answer in the space provided.

_____1. Using the following equation, how many moles of N_2 are needed to form 2 moles of NH_3?

$$N_2(g) + 3\ H_2(g) \rightarrow 2NH_3(g)$$

a) 1 mol
b) 2 mol
c) 3 mol
d) 4 mol
e) None of the above

_____2. What is the molar mass of $Al(NO_3)_3$?

a) 56.99 g/mol
b) 88.99 g/mol
c) 213.01 g/mol
d) 117.01 g/mol
e) None of the above

_____3. I need .50 mol Na_3PO_4 for a reaction. The molar mass of Na_3PO_4 is 163.94 g/mol. How many grams should I use?

a) 327.88 g
b) 81.97 g
c) 163.94 g
d) 41.00 g
e) None of the above

_____4. A student dissolves 0.43 moles of NaCl in 200mL water. What is the molarit of the solution?

a) .086M
b) 0.63M
c) .00215M
d) 2.15M
e) None of the Above

_____5. You need 0.4600 moles of HCl for a reaction. How many mL of .8500M HCl do you need to measure out?

a) 541.2 mL
b) 54.12 mL
c) 391 mL
d) .391 mL
e) None of the Above

_____6. If the theoretical yield for a reaction is 5.00g of product, but you only recover 4.00g, what is the percent yield of the reaction?

a) 120%
b) 20%
c) .80%
d) 80%
e) None of the above

_____7. In a reaction, the reactant that runs out first is called the _____.

a) Excess reactant
b) Limiting reactant
c) Percent yield
d) Theoretical yield
e) None of the above

_____8. If you calculate that you will make 10.00g of a product, but the reaction has a 72% yield, what can you expect to actually recover?

a) 13.9 g
b) 8.3 g
c) 7.20 g
d) 4.67 g
e) None of the above

_____9. If 50 mL of a 1.50M solution of $NaNO_3$ is diluted to a final volume of 150mL, what is the molarity of the final solution?

a) .25M
b) .5 M
c) .75 M
d) 3.0M
e) None of the above

_____10. This is a free question… Happy 4 points!

Problems: Work the following problems. Show your work to get credit for the problems!

1. (10 Pts) How many mL of 12.0M HCl stock solution do I need in order to make 755mL of 1.50 M HCl solution?

2. (10 Points) If I want to make 150mL of a .55 M solution of KOH, how many grams should I add?

3. (10 Pts) H_2SO_4 is neutralized by NaOH following the balanced chemical reaction given below:

$$H_2SO_4(aq) + 2\ NaOH\ (aq) \rightarrow 2\ H_2O(l) + Na_2SO_4(aq)$$

How many mL of 1.45M NaOH are needed to completely neutralize a solution containing 65.2mL of 2.93M H_2SO_4 ?

4. (10 Points) Consider the following balanced equation:

$$SiO_2 + 3\ C \rightarrow SiC + 2\ CO$$

If I have 12.4 g SiO_2 (MM=60.09 g/mol) and excess carbon, how many grams of CO (MM=28.01 g/mol) can I make?

5. (20 Pts) For the reaction shown, determine the limiting reagent and theoretical yield (in grams of Al_2O_3, MM=101.96g/mol) if you begin with 12.3g Al and 14.6 g O_2.

$$4\ Al(s) + 3O_2(g) \rightarrow 2Al_2O_3(s)$$