Name: _____ Class: _____ Date: _____ ID: A

Stoichiometry Homework

Multiple Choice

Identify the choice that best completes the statement or answers the question. Please show all work for full credit. This assignmnet is due 11/14/18 by 5:40 pm.

____ 1. How many grams of Li_3N can be formed from 1.75 moles of Li? Assume an excess of nitrogen.

$$6\ Li(s) + N_2(g) \rightarrow 2\ Li_3N(s)$$

a. 18.3 g Li_3N
b. 20.3 g Li_3N
c. 58.3 g Li_3N
d. 61.0 g Li_3N
e. 15.1 g Li_3N

____ 2. How many moles of oxygen are formed when 58.6 g of KNO_3 decomposes according to the following reaction? The molar mass of KNO_3 is 101.11 g/mol.

$$4\ KNO_3(s) \rightarrow 2\ K_2O(s) + 2\ N_2(g) + 5\ O_2(g)$$

a. 0.290 mol O_2
b. 0.580 mol O_2
c. 18.5 mol O_2
d. 0.724 mol O_2
e. 1.73 mol O_2

____ 3. A 12.39 g sample of phosphorus reacts with 42.54 g of chlorine to form only phosphorus trichloride (PCl_3). If it is the only product, what mass of PCl_3 is formed?

a. 30.15 g
b. 54.93 g
c. 140.01 g
d. 79.71 g
e. 91.86 g

____ 4. Determine the theoretical yield of HCl if 60.0 g of BCl_3 and 37.5 g of H_2O are reacted according to the following balanced reaction. A possibly useful molar mass is BCl_3 = 117.16 g/mol.

$$BCl_3(g) + 3\ H_2O(l) \rightarrow H_3BO_3(s) + 3\ HCl(g)$$

a. 75.9 g HCl
b. 132 g HCl
c. 187 g HCl
d. 56.0 g HCl
e. 25.3 g HCl

____ 5. Determine the molarity of a solution formed by dissolving 3.00 moles of NaCl in enough water to yield 4.00 L of solution.
a. 1.33 M
b. 2.00 M
c. 0.750 M
d. 3.00 M
e. 12.00 M

____ 6. How many molecules of sucrose ($C_{12}H_{22}O_{11}$, molar mass = 342.30 g/mol) are contained in 14.3 mL of 0.140 M sucrose solution?
a. 8.29×10^{22} molecules $C_{12}H_{22}O_{11}$
b. 1.21×10^{21} molecules $C_{12}H_{22}O_{11}$
c. 6.15×10^{22} molecules $C_{12}H_{22}O_{11}$
d. 1.63×10^{23} molecules $C_{12}H_{22}O_{11}$
e. 5.90×10^{24} molecules $C_{12}H_{22}O_{11}$

____ 7. According to the following reaction, what volume of 0.244 M KCl solution is required to react exactly with 50.0 mL of 0.210 M $Pb(NO_3)_2$ solution?

$$2\ KCl(aq) + Pb(NO_3)_2(aq) \rightarrow PbCl_2(s) + 2\ KNO_3(aq)$$

a. 97.4 mL
b. 116 mL
c. 43.0 mL
d. 86.1 mL
e. 58.1 mL

____ 8. Determine the number of grams H_2 formed when 250.0 mL of 0.743 M HCl solution reacts with 3.41×10^{23} atoms of Fe according to the following reaction.

$$2\ HCl(aq) + Fe(s) \rightarrow H_2(g) + FeCl_2(aq)$$

a. 0.374 g
b. 1.33 g
c. 1.14 g
d. 0.187 g
e. 1.51 g

____ 9. What mass (in g) of AgCl is formed from the reaction of 75.0 mL of a 0.078 M $AgC_2H_3O_2$ solution with 55.0 mL of 0.109 M $MgCl_2$ solution?

$$2\ AgC_2H_3O_2(aq) + MgCl_2(aq) \rightarrow 2\ AgCl(s) + Mg(C_2H_3O_2)_2(aq)$$

a. 0.838 g
b. 1.72 g
c. 0.859 g
d. 2.56 g
e. 1.70 g

____ 10. According to the following balanced reaction, how many moles of NO are formed from 12.66 moles of NO_2 if there is plenty of water present?

$$3\ NO_2(g) + H_2O(l) \rightarrow 2\ HNO_3(aq) + NO(g)$$

a. 37.98 moles NO
b. 18.99 moles NO
c. 12.66 moles NO
d. 8.44 moles NO
e. 4.22 moles NO

____ 11. Consider the following reaction. How many moles of oxygen are required to produce 4.00 moles of water? Assume that there is excess C_3H_7SH present.

$$C_3H_7SH(l) + 6\ O_2(g) \rightarrow 3\ CO_2(g) + SO_2(g) + 4\ H_2O(g)$$

a. 2.67 moles O_2
b. 6.00 moles O_2
c. 4.00 moles O_2
d. 16.0 moles O_2
e. 1.00 moles O_2

____ 12. Lithium and nitrogen react to produce lithium nitride:

$$6\ Li(s) + N_2(g) \rightarrow 2\ Li_3N(s)$$

How many moles of N_2 are needed to react with 0.550 mol of lithium?
a. 3.30
b. 0.550
c. 0.183
d. 1.65
e. 0.0917

____ 13. Automotive air bags inflate when sodium azide decomposes explosively to its constituent elements:

$$2\ NaN_3(s) \rightarrow 2\ Na(s) + 3\ N_2(g)$$

How many grams of sodium azide are required to produce 25.0 g of nitrogen?
a. 1.34
b. 0.595
c. 58.0
d. 38.7
e. 87.0

____ 14. Balance the chemical equation given below, and determine the number of moles of iodine that react with 40.0 g of aluminum.

_____ $Al(s)$ + _____ $I_2(s)$ → _____ $Al_2I_6(s)$

a. 0.988 mol
b. 2.22 mol
c. 2.97 mol
d. 4.45 mol

____ 15. If the percent yield for the following reaction is 65.0%, how many grams of $KClO_3$ are needed to produce 4.00 g of O_2?

$2\ KClO_3(s) \rightarrow 2\ KCl(s) + 3\ O_2(g)$

a. 6.63 g
b. 10.2 g
c. 15.7 g
d. 35.3 g