

white version

CHM151

Quiz 2a

25 Pts

Spring 2020

Name:

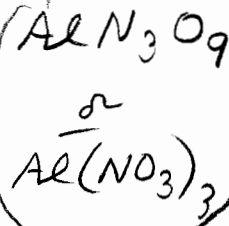
Key

SHOW ALL WORK TO RECEIVE CREDIT

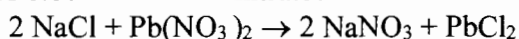
Molar masses: C 12.01; N 14.01; O 16.00; Na 22.99; Al 26.98; S 32.06; Fe 55.85; I 126.9;

1. (5 Pts) A sample of unknown ore was analyzed and found to contain 12.7% Al, 19.7% N, and 67.6% O. What is the empirical formula of this ore?

$$\begin{aligned} \text{Al: } & \frac{12.7\%}{26.98\%} = 0.4707 \div 0.4707 = 1 \\ \text{N: } & \frac{19.7\%}{14.01\%} = 1.406 \div 0.4707 = 2.99 \\ \text{O: } & \frac{67.6\%}{16.00\%} = 4.225 \div 0.4707 = 8.98 \end{aligned}$$

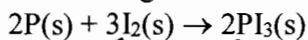


2. (5 Pts) How many moles of sodium nitrate would be produced from the complete reaction of 6.80 mol of lead nitrate?



$$\begin{array}{l|l} 6.80 \text{ mol } \text{Pb}(\text{NO}_3)_2 & 2 \text{ mol NaNO}_3 \\ \hline 1 \text{ mol } \text{Pb}(\text{NO}_3)_2 & 2 \text{ mol NaNO}_3 \end{array} = 13.6 \text{ mol NaNO}_3$$

3. (5 Pts) What is the theoretical yield of PI_3 if 58.0 g of I_2 are reacted with an excess of phosphorus according to the following chemical equation?



(I will accept 0.152 moles)

$$\begin{array}{l|l|l|l} 58.0 \text{ g } \text{I}_2 & \text{mol } \text{I}_2 & 2 \text{ mol } \text{PI}_3 & 411.67 \text{ g } \text{PI}_3 \\ \hline 253.8 \text{ g } \text{I}_2 & 3 \text{ mol } \text{I}_2 & 2 \text{ mol } \text{PI}_3 & \text{mol } \text{PI}_3 \end{array} = 62.7 \text{ g } \text{PI}_3$$

4. (3 Pts) Calculate the molar mass, in g/mol, of $\text{Al}_2(\text{SO}_4)_3$.

$$\begin{array}{l} 2 \times 26.98 \\ 3 \times 32.06 \\ 12 \times 16.00 \end{array}$$

342.14 g/mol

5. (3 Pts) An atom of the isotope of ^{137}Ba consists of how many protons (p), neutrons (n) and electrons (e)

Protons 56 neutrons 81 electrons 56
 $137 - 56 =$

6. (3 Pts) How many moles of iron are present in an iron cylinder that weighs 25 g?

$$\frac{25 \text{ g}}{55.85 \text{ g/mol}} = 0.447 \text{ moles}$$

Green

CHM151

Quiz 2B

25 Pts

Spring 2020

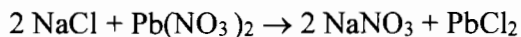
Name:

Key

SHOW ALL WORK TO RECEIVE CREDIT

Molar masses: C 12.01; N 14.01; O 16.00; Na 22.99; Al 26.98; S 32.06; Fe 55.85; I 126.9;

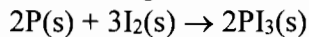
1. (5 Pts) How many moles of sodium nitrate would be produced from the complete reaction of 8.80 mol of lead nitrate?



? mol 8.80 mol

$$\frac{8.80 \text{ mol } \text{Pb}(\text{NO}_3)_2}{1 \text{ mol } \text{Pb}(\text{NO}_3)_2} \times \frac{2 \text{ mol } \text{NaNO}_3}{1 \text{ mol } \text{Pb}(\text{NO}_3)_2} = 17.6 \text{ mol } \text{NaNO}_3$$

3. (5 Pts) What is the theoretical yield of PI_3 if 78.0 g of I_2 are reacted with an excess of phosphorus according to the following chemical equation? (Accept either 0.204 mol PI_3)



$$\frac{78.0 \text{ g } \text{I}_2}{253.8 \text{ g } \text{I}_2} \times \frac{2 \text{ mol } \text{PI}_3}{3 \text{ mol } \text{I}_2} \times \frac{411.67 \text{ g } \text{PI}_3}{1 \text{ mol } \text{PI}_3} = 84.3 \text{ g } \text{PI}_3$$

4. (3 Pts) Calculate the molar mass, in g/mol, of $\text{Al}_2(\text{SO}_3)_3$.

$$(2 \times 26.98) + (3 \times 32.06) + (9 \times 16.00) = 294.14 \text{ g/mol}$$

4. (5 Pts) A sample of unknown ore was analyzed and found to contain 12.7% Al, 19.7% N, and 67.6% O. What is the empirical formula of this ore?

Same as Quiz 2a

5. (3 Pts) An atom of the isotope of ^{138}Ba consists of how many protons (p), neutrons (n) and electrons (e)

Protons 56 neutrons 82 electrons 56

6. (3 Pts) How many moles of iron are present in an iron cylinder that weighs 45 g?

$$\frac{45 \text{ g}}{55.85 \text{ g/mol}} = 0.805 \text{ mol}$$