Name _____ Chapter 3 Review Assignment

1. Write the balanced equation for the reaction that occurs when solid potassium nitrate is heated and decomposes to form solid potassium nitrite and oxygen gas.

 $\begin{array}{ll} \text{a.} & 2\text{KNO}_3(s) \longrightarrow 2\text{KNO}_2(s) + \text{O}_2(g) \\ \text{b.} & \text{KNO}_3(s) \longrightarrow \text{KNO}_2(s) + (1/2)\text{O}_2(g) \\ \text{c.} & 2\text{KNO}_4(s) \longrightarrow 2\text{KNO}_3(s) + \text{O}_2(g) \\ \text{d.} & 2\text{KNO}_3 \longrightarrow 2\text{KNO}_2 + \text{O}_2 \end{array}$

2. What is the formula weight of $(NH_4)_2SO_4$?

- a. 118 amu
- ^{b.} 132 amu
- c. 100 amu
- d. 116 amu

3. Balance the following equation and indicate whether it is a combustion, combination, or decomposition reaction:

 $\begin{array}{c} \text{Li} + \text{N}_2 \longrightarrow \text{Li}_3\text{N} \\ \textcircled{0}{0} \text{6Li} + \text{N}_2 \longrightarrow 2\text{Li}_3\text{N}, \text{ combustion} \\ \textcircled{0}{0} \text{Li} + \text{N}_2 \longrightarrow 3\text{Li}_3\text{N}, \text{ decomposition} \\ \textcircled{0}{0} \text{6Li} + \text{N}_2 \longrightarrow 2\text{Li}_3\text{N}, \text{ combination reaction} \\ \textcircled{0}{0} \text{6Li} + \text{N}_2 \longrightarrow 2\text{Li}_3\text{N}, \text{ decomposition reaction} \\ \textcircled{0}{0} \text{Li} + \text{N}_2 \longrightarrow 3\text{Li}_3\text{N}, \text{ combination} \end{array}$

4. Suppose you are setting up a reaction that requires an iodide salt and are planning to use sodium iodide. However, at the last minute you find that you are out of sodium iodide, so you must use potassium iodide instead. Will you need to weigh out more, less, or the same mass of potassium iodide in order to get the same number of moles of iodide ions?



⊙more ⊙same ⊙less 5. Convert the following to a balanced chemical reaction:

Gaseous hydrogen reacts with carbon monoxide to form methanol, CH₃OH.

- a. $2H_2 + CO \longrightarrow CH_3OH$
- b. $4H + CO \longrightarrow CH_3OH$
- c. $2H_2 + CO_2 \longrightarrow CH_3OH$
- d. $H_2 + CO \longrightarrow CH_3OH$
- 6. Balance the following equation:

$$\begin{array}{ll} \mathrm{Mg}_{3}\mathrm{N}_{2} + \mathrm{H}_{2}\mathrm{O} \longrightarrow \mathrm{Mg}(\mathrm{OH})_{2} + \mathrm{NH}_{3} \\ a. & \mathrm{Mg}_{3}\mathrm{N}_{2} + 6\mathrm{H}_{2}\mathrm{O} \longrightarrow \mathrm{3Mg}(\mathrm{OH})_{2} + 2\mathrm{NH}_{3} \\ b. & \mathrm{Mg}_{3}\mathrm{N}_{2} + \mathrm{3H}_{2}\mathrm{O} \longrightarrow \mathrm{3Mg}(\mathrm{OH})_{2} + 2\mathrm{NH}_{3} \\ c. & \mathrm{Mg}_{3}\mathrm{N}_{2} + 2\mathrm{H}_{2}\mathrm{O} \longrightarrow \mathrm{Mg}(\mathrm{OH})_{2} + \mathrm{NH}_{3} \\ d. & \mathrm{Mg}_{3}\mathrm{N}_{2} + 6\mathrm{H}_{2}\mathrm{O} \longrightarrow \mathrm{3Mg}(\mathrm{OH})_{2} + \mathrm{NH}_{3} \end{array}$$

7. Calculate the number of molecules in a tablespoon of table sugar, $C_{12}H_{22}O_{11}$, weighing 10.5 g.

- a. 6.02 x 10²³
- b. 1.85 x 10²²
- c. 6.32 x 10²⁴
- d. 2.22 x 10²³
 - 3.01 x 10²³

8. Potassium sulfate contains 44.9 percent potassium by mass. In a 50.0-g sample of potassium sulfate, the number of moles of potassium is

- a. 1.74 mol.
- b. 1.28 mol.
- c. 0.574 mol.
- d. 2.00 mol.
- e. 0.287 mol.

9. The reaction C_7H_8 + 3HNO₃ ---> $C_7H_5N_3O_6$ + 3H₂O can be used to make TNT. How many grams of HNO₃ are required to react with 10.0 g of C_7H_8 ?

- a. 6.81 g
- b. 10.1 g
- c. 2.28 g
- d. 30.0 g
- e. 20.5 g

10. Calculate the number of moles of water present in a 10.0-kg sample.

- a. 55.5 mol
- b. 1.80 x 10² mol
- c. none of these
- d. 555 mol
- e. 1.80 x 10⁵ mol

11. How many F^{-} ions are present in 2.50 mol of BaF₂?

- a. (2.50
- b. 1.51 x 10²⁴
- c. 8.31 x 10⁻²⁴
- d. 3.01 x 10²⁴
- e. 5.00

12. What mass of silver chloride can be made from the reaction of 4.22 g of silver nitrate with 7.73 g of aluminum chloride? (Be sure to balance the reaction.)

 $AgNO_3 + AICI_3 \rightarrow AI(NO_3)_3 + AgCI$

13. What is the maximum mass of Cu that is produced by the reaction of 30.0 g of CuO and 20.0 g of CH4?

$$4CuO + CH_4 \rightarrow 2H_2O + 4Cu + CO_2$$