

Name: _____

KEY!

Per _____

Unit 6 Review:*Chemical Reactions and Stoichiometry***I. States of Matter**

1. What are the three states of matter? For each state, say whether it is compressible, or if the state will fill the container?

solid - not compressible, won't fill container

liquid - not compressible, will fill container

gas - compressible, will fill container

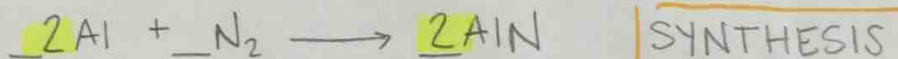
II. Chemical and Physical Changes:

1. Is each of the following a PHYSICAL or CHEMICAL change? Explain your reasoning with evidence.

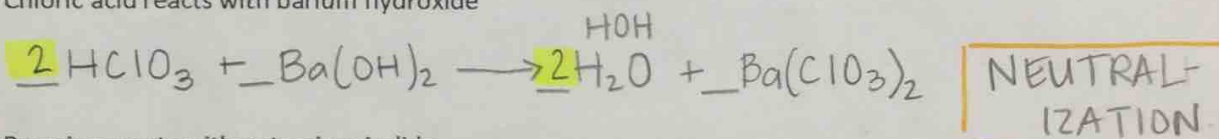
a. P Paper is torn shape Δb. C Fireworks burst color Δc. P Cocoa powder dissolves in milk dissolvesd. C when iron and sulfur are heated, and black solid forms that's not magnetic
new product formed w/ different magnetic properties.**III. Reaction Types:**

1. Classify the reaction, predict the products, and balanced the chemical equation.

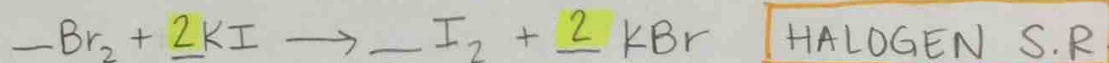
a. Aluminum combines with nitrogen



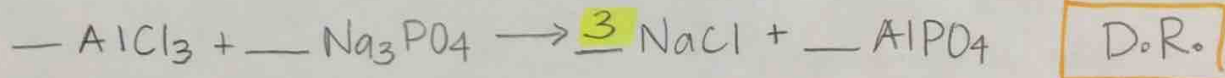
b. Chloric acid reacts with barium hydroxide



c. Bromine reacts with potassium iodide



d. Aluminum chloride reacts with sodium phosphate

**IV. Mole Ratios**

1. Use the following balanced chemical equation to answer the following questions.

a. If 0.20 mol of C_5H_{12} reacts, determine the moles of O_2 reacting

$$0.20 \text{ mol } \text{C}_5\text{H}_{12} \times \frac{8 \text{ mol } \text{O}_2}{1 \text{ mol } \text{C}_5\text{H}_{12}} = 1.6 \text{ mol } \text{O}_2$$

b. If 4.8 mol of O_2 reacts, determine the moles of H_2O produced

$$4.8 \text{ mol } \text{O}_2 \times \frac{6 \text{ mol } \text{H}_2\text{O}}{8 \text{ mol } \text{O}_2} = 3.6 \text{ mol } \text{H}_2\text{O}$$

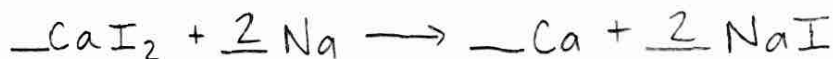
- c. If 30 mol of H₂O is produced, determine the moles of CO₂ produced

$$30 \text{ mol H}_2\text{O} \times \frac{5 \text{ mol CO}_2}{6 \text{ mol H}_2\text{O}} = 25 \text{ mol CO}_2$$

- d. If 0.015 mol of CO₂ is produced, determine the moles of C₅H₁₂ reacting

$$0.015 \text{ mol CO}_2 \times \frac{1 \text{ mol C}_5\text{H}_{12}}{5 \text{ mol CO}_2} = 0.0030 \text{ mol C}_5\text{H}_{12}$$

2. Calcium iodide is reacted with sodium. Write a balanced chemical equation for this reaction, and then answer the following questions.



metallic
S.R

- a. If 2.2 mol of calcium iodide reacts, determine the moles of sodium reacting and the moles of each product.

$$2.2 \text{ mol CaI}_2 \times \frac{2 \text{ mol Na}}{1 \text{ mol CaI}_2} = 4.4 \text{ mol Na}$$

$$2.2 \text{ mol CaI}_2 \times \frac{1 \text{ mol Ca}}{1 \text{ mol CaI}_2} = 2.2 \text{ mol Ca}$$

$$2.2 \text{ mol CaI}_2 \times \frac{2 \text{ mol NaI}}{1 \text{ mol CaI}_2} = 4.4 \text{ mol NaI}$$

- b. If 0.016 mol of sodium reacts, determine the moles of calcium iodide reacting and the moles of each product.

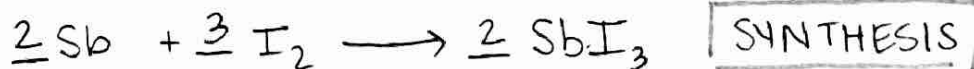
$$0.016 \text{ mol Na} \times \frac{1 \text{ mol CaI}_2}{2 \text{ mol Na}} = 0.0080 \text{ mol CaI}_2$$

$$0.016 \text{ mol Na} \times \frac{1 \text{ mol Ca}}{2 \text{ mol Na}} = 0.0080 \text{ mol Ca}$$

$$0.016 \text{ mol Na} \times \frac{2 \text{ mol NaI}}{2 \text{ mol Na}} = 0.016 \text{ mol NaI}$$

V. Mass-Mass stoichiometry

1. Antimony and iodine can be combined to form antimony triiodide. If 60.09 g of antimony are present, what mass of iodine will be required in the reaction? What mass of antimony triiodide will be produced?



$$60.09 \text{ g Sb} \times \frac{1 \text{ mol Sb}}{121.8 \text{ g Sb}} \times \frac{3 \text{ mol I}_2}{2 \text{ mol Sb}} \times \frac{253.8 \text{ g I}_2}{1 \text{ mol I}_2} = 187.8 \text{ g I}_2$$

$$60.09 \text{ g Sb} \times \frac{1 \text{ mol Sb}}{121.8 \text{ g Sb}} \times \frac{2 \text{ mol SbI}_3}{2 \text{ mol Sb}} \times \frac{502.5 \text{ g SbI}_3}{1 \text{ mol SbI}_3} = 247.9 \text{ g SbI}_3$$