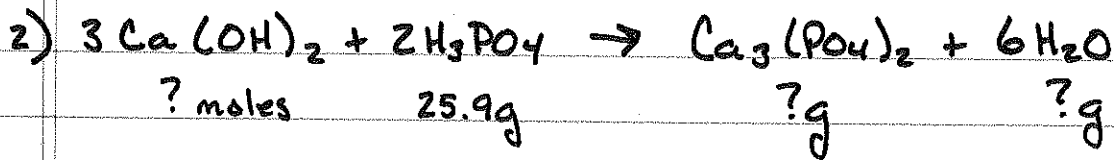


1) stoichiometry - The study of the amount of substances consumed & produced in chemical Rxn's

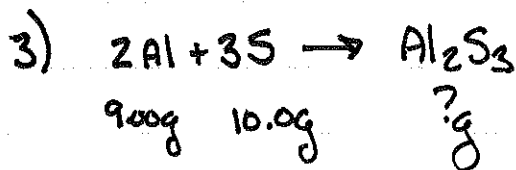


$$A) \quad \left(\frac{25.9 \text{g H}_3\text{PO}_4}{1} \right) \left(\frac{1 \text{ mole H}_3\text{PO}_4}{98.0 \text{g H}_3\text{PO}_4} \right) \left(\frac{6 \text{ mole H}_2\text{O}}{2 \text{ mole H}_3\text{PO}_4} \right) \left(\frac{18.0 \text{g H}_2\text{O}}{1 \text{ mole H}_2\text{O}} \right) = \boxed{14.3 \text{g H}_2\text{O}}$$

B) Double Replacement

$$C) \quad \left(\frac{25.9 \text{g H}_3\text{PO}_4}{1} \right) \left(\frac{1 \text{ mole H}_3\text{PO}_4}{98.0 \text{g H}_3\text{PO}_4} \right) \left(\frac{3 \text{ mole Ca(OH)}_2}{2 \text{ mole H}_3\text{PO}_4} \right) = \boxed{.396 \text{ mole Ca(OH)}_2}$$

$$D) \quad \left(\frac{25.9 \text{g H}_3\text{PO}_4}{1} \right) \left(\frac{1 \text{ mole H}_3\text{PO}_4}{98.0 \text{g H}_3\text{PO}_4} \right) \left(\frac{1 \text{ mole Ca}_3(\text{PO}_4)_2}{2 \text{ mole H}_3\text{PO}_4} \right) \left(\frac{310.3 \text{g Ca}_3(\text{PO}_4)_2}{1 \text{ mole Ca}_3(\text{PO}_4)_2} \right) = \boxed{41.0 \text{g Ca}_3(\text{PO}_4)_2}$$



Limiting?
g excess?

$$\left(\frac{9.00\text{g Al}}{1} \right) \left(\frac{1\text{mole Al}}{27.0\text{g Al}} \right) \left(\frac{3\text{mole S}}{2\text{mole Al}} \right) \left(\frac{32.1\text{g S}}{1\text{mole S}} \right) = 16.1\text{g S needed}$$

only have 10.0g

So S is Limiting
Al is Excess

$$\left(\frac{10.0\text{g S}}{1} \right) \left(\frac{1\text{mole S}}{32.1\text{g S}} \right) \left(\frac{2\text{mole Al}}{3\text{mole S}} \right) \left(\frac{27.0\text{g Al}}{1\text{mole Al}} \right) = 5.61\text{g Al needed}$$

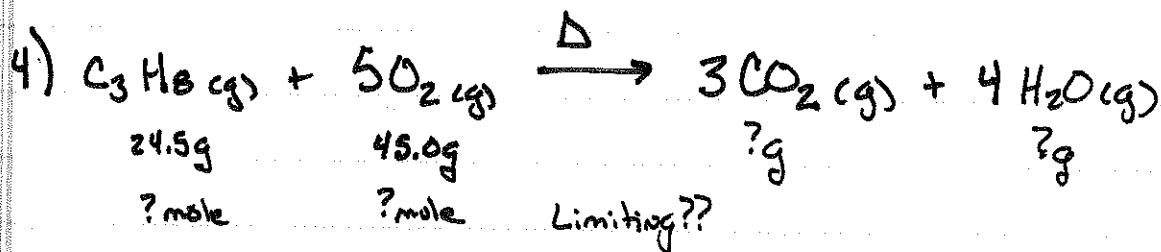
9.00 g Al Given

5.61 g Al needed

3.39 g Al Excess

Product? Al_2S_3 * Start w/ Limiting

$$\left(\frac{10.0\text{g S}}{1} \right) \left(\frac{1\text{mole S}}{32.1\text{g S}} \right) \left(\frac{1\text{mole Al}_2\text{S}_3}{3\text{mole S}} \right) \left(\frac{150.3\text{g Al}_2\text{S}_3}{1\text{mole Al}_2\text{S}_3} \right) = 15.6\text{g Al}_2\text{S}_3$$



$$\left(\frac{24.5\text{g C}_3\text{H}_8}{1} \right) \left(\frac{1\text{ mole C}_3\text{H}_8}{44.0\text{g C}_3\text{H}_8} \right) = .557 \text{ mole C}_3\text{H}_8$$

$$\left(\frac{45.0\text{g O}_2}{1} \right) \left(\frac{1\text{ mole O}_2}{32.0\text{g O}_2} \right) = 1.41 \text{ mole O}_2$$

$$\left(\frac{45.0\text{g O}_2}{1} \right) \left(\frac{1\text{ mole O}_2}{32.0\text{g O}_2} \right) \left(\frac{1\text{ mole C}_3\text{H}_8}{5\text{ mole O}_2} \right) \left(\frac{44.0\text{g C}_3\text{H}_8}{1\text{ mole C}_3\text{H}_8} \right) = 12.4\text{g C}_3\text{H}_8$$

Have
Needed

Have 24.5g C₃H₈, Need 12.4g C₃H₈

So C₃H₈ is Excess
 O₂ is Limiting

Products - start w/ Limiting

$$\left(\frac{1.41\text{ mole O}_2}{1} \right) \left(\frac{3\text{ mole CO}_2}{5\text{ mole O}_2} \right) \left(\frac{44.0\text{g CO}_2}{1\text{ mole CO}_2} \right) = \boxed{37.2\text{g CO}_2}$$

$$\left(\frac{1.41\text{ mole O}_2}{1} \right) \left(\frac{4\text{ mole H}_2\text{O}}{5\text{ mole O}_2} \right) \left(\frac{18.0\text{g H}_2\text{O}}{1\text{ mole H}_2\text{O}} \right) = \boxed{20.3\text{g H}_2\text{O}}$$