

### More Molarity Practice (plus mole ratios)

- Suppose you react  $\text{Ca}(\text{NO}_3)_2$  with  $\text{BaI}_2$  to produce  $\text{Ba}(\text{NO}_3)_2$  and  $\text{CaI}_2$ .
  - Balance the equation.
  - Predict which ratio of reactants will give the most product.
  - Indicate which of the following mixtures will make the largest amount of precipitate.
    - 100 mL of 1.0 M  $\text{Ca}(\text{NO}_3)_2$  + 200 mL of 2.0 M  $\text{Ba}(\text{NO}_3)_2$
    - 200 mL of 1.0 M  $\text{Ca}(\text{NO}_3)_2$  + 200 mL of 2.0 M  $\text{Ba}(\text{NO}_3)_2$
    - 100 mL of 1.0 M  $\text{Ca}(\text{NO}_3)_2$  + 200 mL of 1.0 M  $\text{Ba}(\text{NO}_3)_2$
    - 500 mL of 10 M  $\text{Ca}(\text{NO}_3)_2$  + 1 L of 5.0 M  $\text{Ba}(\text{NO}_3)_2$
- Suppose you react  $\text{NaCl}$  with  $\text{Ag}_2\text{SO}_4$  to produce  $\text{Na}_2\text{SO}_4$  and  $\text{AgCl}$ .
  - Balance the equation.
  - Predict which ratio of reactants will give the most product.
  - Indicate which of the following mixtures will make the largest amount of precipitate.
    - 100 mL of 1.0 M  $\text{NaCl}$  + 100 mL of 0.1 M  $\text{Ag}_2\text{SO}_4$
    - 200 mL of 1.0 M  $\text{NaCl}$  + 400 mL of 0.1 M  $\text{Ag}_2\text{SO}_4$
    - 400 mL of 1.0 M  $\text{NaCl}$  + 200 mL of 1.0 M  $\text{Ag}_2\text{SO}_4$
    - 1.0 L of 0.1 M  $\text{NaCl}$  + 2.0 L of 1.0 M  $\text{Ag}_2\text{SO}_4$
- Suppose you react  $\text{Na}_3\text{PO}_4$  +  $\text{Ba}(\text{OH})_2$  to produce  $\text{Ba}_3(\text{PO}_4)_2$  and  $\text{NaOH}$ .
  - Balance the equation.
  - Predict which ratio of reactants will give the most product.
  - Indicate which of the following mixtures will make the largest amount of precipitate.
    - 100 mL of 2.0 M  $\text{Na}_3\text{PO}_4$  + 100 mL of 3.0 M  $\text{Ba}(\text{OH})_2$
    - 200 mL of 2.0 M  $\text{Na}_3\text{PO}_4$  + 300 mL of 3.0 M  $\text{Ba}(\text{OH})_2$
    - 500 mL of 0.1 M  $\text{Na}_3\text{PO}_4$  + 200 mL of 0.1 M  $\text{Ba}(\text{OH})_2$
    - 250 mL of 0.1 M  $\text{Na}_3\text{PO}_4$  + 100 mL of 0.1 M  $\text{Ba}(\text{OH})_2$
- Suppose you react  $\text{AlCl}_3$  with  $\text{KI}$ .
  - Predict the products and balance the equation.
  - Predict which ratio of reactants will give the most product.
  - Indicate which of the following mixtures will make the largest amount of precipitate.
    - 100 mL of 0.5 M  $\text{AlCl}_3$  + 300 mL of 0.1 M  $\text{KI}$
    - 300 mL of 0.5 M  $\text{AlCl}_3$  + 100 mL of 0.5 M  $\text{KI}$
    - 100 mL of 0.5 M  $\text{AlCl}_3$  + 100 mL of 1.5 M  $\text{KI}$
    - 200 mL of 0.5 M  $\text{AlCl}_3$  + 200 mL of 0.5 M  $\text{KI}$
- Suppose you react  $\text{K}_2\text{CO}_3$  with  $\text{CaBr}_2$ .
  - Predict the products and balance the equation.
  - Predict which ratio of reactants will give the most product.
  - Indicate which of the following mixtures will make the largest amount of precipitate.
    - 100 mL of 0.5 M  $\text{K}_2\text{CO}_3$  + 100 mL of 1.0 M  $\text{CaBr}_2$
    - 500 mL of 0.5 M  $\text{K}_2\text{CO}_3$  + 1.0 L of 1.0 M  $\text{CaBr}_2$
    - 250 mL of 0.5 M  $\text{K}_2\text{CO}_3$  + 250 mL of 0.25 M  $\text{CaBr}_2$
    - 600 mL of 0.5 M  $\text{K}_2\text{CO}_3$  + 600 mL of 0.5 M  $\text{CaBr}_2$

#### *Selected Answers:*

- 4a) The products are  $\text{AlI}_3$  and  $\text{KCl}$ . The balanced equation is:  $\text{AlCl}_3 + 3\text{KI} \rightarrow \text{AlI}_3 + 3\text{KCl}$   
4b) A 1:3 ratio (1 mole of  $\text{AlCl}_3$ ; 3 moles of  $\text{KI}$ ) will give the most product  
4c) (iii) will be the mixture that gives the most product (0.05 mol:0.15 mol  $\Rightarrow$  1:3)  
5a) The products are  $\text{KBr}$  and  $\text{CaCO}_3$ . The answer is not given for the balanced equation.