

## Chapter 16 Pretest

Key

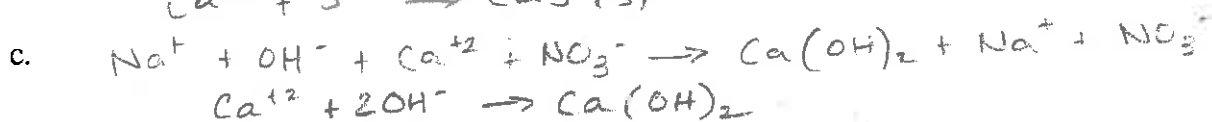
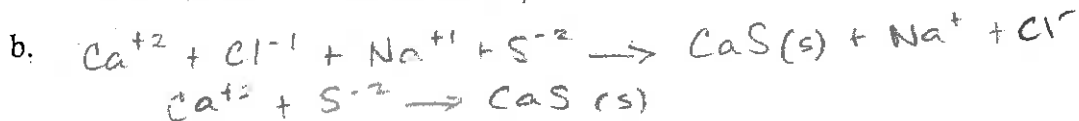
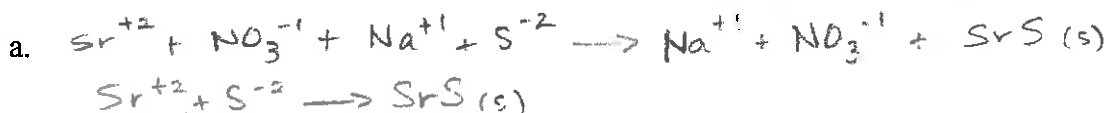
The following data was obtained in an experiment similar to the one you did before spring break. Use the data to answer the following questions.

	Na <sub>2</sub> S	NaCl	Ca(NO <sub>3</sub> ) <sub>2</sub>	KNO <sub>3</sub>
Sr(NO <sub>3</sub> ) <sub>2</sub>	ppt	soluble	soluble	soluble
NaOH	soluble	soluble	ppt	soluble
CaCl <sub>2</sub>	ppt	soluble	soluble	soluble

1. Identify the possible products of these reactions in which a ppt. was formed, and circle the ones that would represent the solid



2. Write the net ionic equations for the reactions in which a ppt. was formed.



3. You are asked to make 180.0 mL of a 0.362 molar solution of Al(OH)<sub>3</sub>. How many grams of the solid aluminum hydroxide would be needed?

$$0.362 = \frac{x}{.180}$$

$$x = 0.06516 \text{ mol}$$

$$\frac{0.06516 \text{ mol}}{1 \text{ mol}} \times 78.0027 \text{ g} = \boxed{5.083 \text{ g}}$$

4. How many liters of 0.241 molar MgCl<sub>2</sub> could you make if you had 16.50 grams of MgCl<sub>2</sub> and all the water you wanted?

$$\frac{16.50 \text{ g}}{95.211 \text{ g}} \times 1 \text{ mol} = 0.173299 \text{ mol}$$

$$0.241 = \frac{0.173299}{x}$$

$$x = \boxed{0.7191 \text{ L}}$$

5. On his way across the backyard, young Buchner Funnel, son of a famous chemistry teacher, fell into a wading pool containing 910 liters of water. As might be expected, young Buchner had 227 grams of strontium phosphate in his pocket. Please calculate the concentration of the aqueous strontium ions in the pool.

$$\frac{\text{Sr}^{+2} \text{PO}_4^{-3} \quad 227 \text{ g}}{\text{Sr}_3(\text{PO}_4)_2 \quad 452.8 \text{ g}} \times 1 \text{ mol} = 0.501325 \text{ mol} \left( \frac{3 \text{ Sr}^{+2}}{1 \text{ mol Sr}_3(\text{PO}_4)_2} \right) = 1.50397$$

$$\frac{1.50397}{910} = \boxed{1.7 \times 10^{-3} \text{ M}}$$

6. Calculate the molarity of a solution that has 57.0 grams of  $\text{Fe}(\text{NO}_3)_3$  dissolved in enough water to make 6.45 liters of solution.

$$\frac{57.0 \text{ g}}{241.8581 \text{ g}} \times 1 \text{ mol} = 0.23567 \text{ mol} \quad \frac{0.23567}{6.45} = \boxed{0.0365 \text{ M}}$$

7. How many grams of  $\text{AgNO}_3$  would be found in a 2.98 molar solution that contained 563 mL of water?

$$2.98 = \frac{x}{.563} \quad \frac{1.67774 \text{ mol} \times 169.873 \text{ g}}{1 \text{ mol}} = \boxed{285 \text{ g}}$$

$$x = 1.67774$$

8. Using the solubility graph, determine whether the following solutions are saturated, unsaturated, or supersaturated.

- a. 960 grams  $\text{NaNO}_3$  in 1000 grams of water at  $30^\circ\text{C}$  saturated  
 $\frac{960}{1000} = \frac{96}{100}$
- b. 140 grams  $\text{KNO}_3$  in 200 grams of water at  $40^\circ\text{C}$  supersaturated  
 $\frac{140}{200} = \frac{70}{100}$
- c. 611 grams of  $\text{NH}_4\text{Cl}$  in 1000 grams of water at  $50^\circ\text{C}$  supersaturated  
 $\frac{611}{1000} = \frac{61.1}{100}$

9. A saturated solution of  $\text{NH}_4\text{Cl}$  is cooled from  $90^\circ\text{C}$  to  $50^\circ\text{C}$ . What mass of  $\text{NH}_4\text{Cl}$  would precipitate out of solution?

$$70 \text{ g @ } 90 \quad 70 - 50 = 20 \text{ g}$$

$$50 \text{ g @ } 50$$

10. When 100 grams of  $\text{KCl}$  is dumped into 200 mL of water at  $10^\circ\text{C}$  not all of the solid will dissolve. To what temperature must the solution be raised so the solution is saturated with no solid remaining?

$$\frac{30}{100} = \frac{60}{200} \quad \frac{100}{200} = \frac{50}{100} \quad \boxed{80^\circ\text{C}}$$

Write the ionic and balanced net ionic equations for each of the following reactions:

