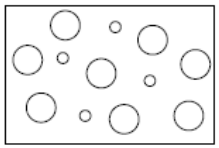
Unit 2: Equations, M, Soln Stoich

Name: _____ Pd____

CHAPTER 4 (Sections 4.1 – 4.4) PRACTICE QUIZ

MULTIPLE CHOICE (NO CALCULATOR ALLOWED)

←Linked at 0:00



1. The particle diagram above represents an aqueous solution of an ionic compound. The smaller circles represent cations and the larger circles represent anions. Water molecules are omitted for clarity. Which of the following solutes does the diagram best represent?

   (A) calcium chloride
   (B) magnesium oxide
   (C) potassium bromide
   (D) sodium sulfide

2. Which of the following choices best represents what happens when solid NH_4NO_3 is dissolved into water?

   (A) $NH_4NO_3(s) \longrightarrow NH_4NO_3(aq)$

   (B) $NH_4NO_3(s) \longrightarrow NH_4^+(aq) + NO_3^-(aq)$

   (C) $NH_4NO_3(s) \longrightarrow NH_3(aq) + H^+(aq) + NO_3^-(aq)$

   (D) $NH_4NO_3(s) \longrightarrow NH_3(aq) + OH^-(aq) + NO_2^-(aq)$

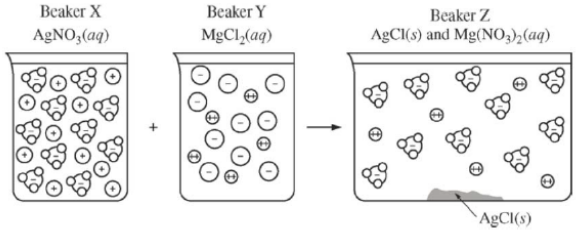
Reaction between a solution of Compound X and a solution of K_2SO_4	Reaction between a solution of Compound X and a solution of $AgNO_3$
white precipitate	white precipitate

3. Compound X is an ionic compound that is soluble in water. An aqueous solution of Compound X is prepared, and a few drops of this solution are tested with two separate solutions. The results of this experiment are shown in the table above. Based on this information, which of the following substances is most likely to represent the identity of Compound X?

   (A) barium chloride
   (B) sodium bromide
   (C) lead carbonate
   (D) strontium nitrate

4. Which of the following would result in the formation of a precipitate when aqueous solutions of each substance are mixed together?

   (A) mercury(I) nitrate and silver acetate
   (B) zinc chloride and aluminum sulfate
   (C) potassium sulfide and lithium phosphate
   (D) sodium iodide and lead(II) nitrate



5. Beaker X and beaker Y each contain 1.0 L of solution, as shown above. A student combines the solutions by pouring them into a larger, previously empty beaker Z and observes the formation of a white precipitate. Assuming that volumes are additive, which of the following sets of solutions could be represented by the diagram above?

	Beaker X	Beaker Y	Beaker Z
(A)	2.0 *M* $AgNO_3$	2.0 *M* $MgCl_2$	4.0 *M* $Mg(NO_3)_2$ and AgCl(*s*)
(B)	2.0 *M* $AgNO_3$	2.0 *M* $MgCl_2$	2.0 *M* $Mg(NO_3)_2$ and AgCl(*s*)
(C)	2.0 *M* $AgNO_3$	1.0 *M* $MgCl_2$	1.0 *M* $Mg(NO_3)_2$ and AgCl(*s*)
(D)	2.0 *M* $AgNO_3$	1.0 *M* $MgCl_2$	0.50 *M* $Mg(NO_3)_2$ and AgCl(*s*)

Skip #6-8

9. Which of the following represents the net-ionic equation for the reaction that occurs when solutions of acetic acid and potassium hydroxide are mixed?

   (A) $H^+(aq) + OH^-(aq) \longrightarrow H_2O(l)$

   (B) $H^+(aq) + KOH(aq) \longrightarrow H_2O(l) + K^+(aq)$

   (C) $CH_3COOH(aq) + OH^-(aq) \longrightarrow H_2O(l) + CH_3COO^-(aq)$

   (D) $CH_3COOH(aq) + KOH(aq) \longrightarrow H_2O(l) + CH_3COOK(aq)$

CHAPTER 4 (Sections 4.1 – 4.4) PRACTICE QUIZ

FREE RESPONSE (CALCULATOR IS ALLOWED)

←Linked at 16:31

3. For each of the following, write the balanced molecular equation and the balanced net ionic equation. You do not have to write (*s*), (*l*), (*g*) or (*aq*).
If no reaction occurs, write NO REACTION.

(a) Solutions of nickel(II) bromide and barium hydroxide are mixed.

molecular equation:

$\longrightarrow$

net ionic equation:

$\longrightarrow$

(b) Solutions of copper(II) chloride and ammonium sulfate are mixed.

molecular equation:

$\longrightarrow$

net ionic equation:

$\longrightarrow$

(c) Solutions of propanoic acid (CH_3CH_2COOH) and sodium hydroxide are mixed.

molecular equation:

$\longrightarrow$

net ionic equation:

$\longrightarrow$

(d) Solutions of nitric acid and methylamine (CH_3NH_2) are mixed.

molecular equation:

$\longrightarrow$

net ionic equation:

$\longrightarrow$

Soluble Ionic Compounds		Important Exceptions
Compounds containing	NO_3^- and $CH_3CO_2^-$	none
	Cl^-, Br^-, and I^-	compounds of Ag^+, Hg_2^{2+}, and Pb^{2+}
	SO_4^{2-}	compounds of Sr^{2+}, Ba^{2+}, Hg_2^{2+}, and Pb^{2+}

Insoluble Ionic Compounds		Important Exceptions
Compounds containing	S^{2-} and OH^-	compounds of NH_4^+, alkali metal cations, Ca^{2+}, Sr^{2+}, and Ba^{2+}
	CO_3^{2-} and PO_4^{3-}	compounds of NH_4^+ and alkali metal cations

(e) Aluminum metal is added to a solution of zinc sulfate.

molecular equation:

$\longrightarrow$

net ionic equation:

$\longrightarrow$

CHAPTER 4 – 5 PRACTICE QUIZ (Sections 4.5 – 4.6 & 5.1 – 5.4)

MULTIPLE CHOICE – NO CALCULATOR ALLOWED

←Linked at 0:00

1. A solution is prepared by combining 100.0 mL of 0.20 *M* Na_2SO_4 with 100.0 mL of 0.50 *M* K_2SO_4. Which of the following choices has correctly arranged the ions in this solution in order of increasing concentration?

	lowest concentration →		highest concentration
(A)	SO_4^{2-}	Na^+	K^+
(B)	Na^+	SO_4^{2-}	K^+
(C)	Na^+	K^+	SO_4^{2-}
(D)	K^+	Na^+	SO_4^{2-}

2. A solution was prepared by dissolving 11 grams of anhydrous calcium chloride (F.W. = 110.98) into water so that the total volume is 500. mL. What is the concentration of chloride ions in this solution?

(A) 0.10 *M*
(B) 0.20 *M*
(C) 0.30 *M*
(D) 0.40 *M*

3. How many grams of glucose (F.W. = 180.156) are present in 500. mL of a 0.50 *M* glucose solution?

(A) 0.25 g
(B) 45 g
(C) 90. g
(D) 180 g

4. In order to prepare 250.0 mL of a hydrochloric acid solution that has a concentration of 0.10 *M*, how many milliliters of 10.0 *M* hydrochloric acid are needed?

(A) 0.25 mL
(B) 2.5 mL
(C) 4.0 mL
(D) 25 mL

5. What is the minimum volume of 2.0 *M* HNO_3 required to neutralize 0.50 mole of $Ca(OH)_2$?

(A) 200 mL
(B) 250 mL
(C) 500 mL
(D) 1000 mL

Skip #6

7. When Solutions #1 and #2 are combined together, silver chloride is produced. Which of the following choices would produce the greatest mass of silver chloride?

	Solution #1	Solution #2
(A)	100. mL of 0.10 *M* $AgNO_3$	100. mL of 0.10 *M* NaCl
(B)	100. mL of 0.10 *M* $AgNO_3$	100. mL of 0.20 *M* $CaCl_2$
(C)	100. mL of 0.20 *M* $AgNO_3$	100. mL of 0.10 *M* $CaCl_2$
(D)	100. mL of 0.30 *M* $AgNO_3$	100. mL of 0.10 *M* NaCl

8. A student was given the task of determining the mass percentage of iodide (I^-) in a potassium iodide (KI) tablet. A tablet with a mass of 0.500 g was dissolved in water and treated with excess $Pb(NO_3)_2(aq)$. This resulted in the formation of a yellow precipitate of $PbI_2(s)$ which was filtered, dried, and weighed. The mass of the precipitate was 0.200 g. Which of the following calculations is set up correctly to determine the mass percentage of iodide in the KI tablet?

(A) $\frac{(0.200)(126.9)}{(461.0)(0.500)} \times 100\%$

(B) $\frac{(0.200)(126.9)}{(461.0)(2)(0.500)} \times 100\%$

(C) $\frac{(0.200)(2)(126.9)}{(461.0)(0.500)} \times 100\%$

(D) $\frac{(0.200)(126.9)(0.500)}{(461.0)} \times 100\%$

CHAPTER 4 – 5 PRACTICE QUIZ (Sections 4.5 – 4.6 & 5.1 – 5.4)

FREE RESPONSE – CALCULATOR IS ALLOWED

←Linked at 16:31

1. A chemistry teacher needs to prepare a silver nitrate solution for a lab experiment.

(a) Calculate the mass of solid silver nitrate that is needed to prepare 500.0 mL of a 0.110 *M* silver nitrate solution. Show the setup for your calculations below. Round off your final answer to the proper number of significant figures.

(b) The experiment to be performed is based on the following chemical equation.

zinc metal + aqueous silver nitrate → aqueous zinc nitrate + silver metal

(i) Write a balanced molecular equation for the reaction shown above.

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(ii) Write a balanced net-ionic equation for the reaction shown above.

→

(c) In the experiment, a 1.50 g sample of zinc metal was combined with 250. mL of 0.110 *M* silver nitrate solution.

(i) Identify the limiting reactant in this experiment, and show calculations to justify your answer.

(ii) On the basis of the limiting reactant identified in part (c)(i), determine the concentration of Zn^{2+} ions in the solution after the reaction is complete. Assume that the final volume of the solution remains unchanged.