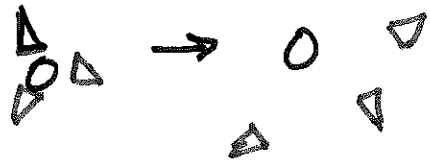
AP Chem - Unit 2

Key

Practice Opportunity A

1. Differentiate between what happens when the following are added to water.
   a. Polar solute versus nonpolar solute — Polar Solute dissolve in water (Because H_2O is polar) Nonpolar solute will not dissolve in water
   b. KF versus $C_6H_{12}O_6$ — KF dissolves in H_2O, produces K^+ & F^- ions, $C_6H_{12}O_6$ (sugar) dissolves but remains molecules Intact
   c. RbCl (strong electrolyte) vs AgCl (weak electrolyte) — RbCl completely dissolves (many ions) AgCl - dissolves very little (few ions)
   d. HNO_3 versus CO — HNO_3 dissolves, produces ions, CO - dissolve but no ions
2. Which of the following statements is(are) true? **For the false statements, correct them.**
   a. A concentrated solution in water will always contain a strong or weak electrolyte.
   False - Concentrated solns can contain Electrolytes or Nonelectrolytes
   b. A strong electrolyte will break up into ions when dissolved in water.
   True
   c. An acid is a strong electrolyte.
   False - Acids can be a strong or weak electrolyte
   d. All ionic compounds are strong electrolytes in water.
   False - insoluble ionic compounds are not strong electrolyte
3. Show how each of the following strong electrolytes "breaks up" into its component ions upon dissolving water by drawing molecular level pictures.

a. $MgCl_2$ Mg^{+2}=O Cl^-=△ 	b. $HClO_4$ H^+=O ClO_4^-=△ 
c. $Al(NO_3)_3$ Al^{+3}=O NO_3^- 	d. $(NH_4)_2SO_4$ NH_4^+=O SO_4^{-2}=△ 

4. Calcium chloride is a strong electrolyte and is used to "salt" streets in the winter to melt ice and snow. Write a reaction to show how this substance breaks apart when in dissolves in water.

$CaCl_{2(s)} \rightarrow Ca^{+2}_{(aq)} + 2Cl^-_{(aq)}$

5. Commercial cold packs and hot packs are available for treating athletic injuries. Both types contain a pouch of water and a dry chemical. When the pack is struck, the pouch of water breaks, dissolving the chemical, and the solution becomes either hot or cold. Many hot packs use magnesium sulfate, and many cold packs use ammonium nitrate. Write reactions to show how these strong electrolytes break apart when they dissolve in water.

Hot Packs→ $MgSO_{4(s)} \rightarrow Mg^{+2}_{(aq)} + SO_4^{-2}{}_{(aq)}$

Cold Packs → $NH_4NO_{3(s)} \rightarrow NH_4^+{}_{(aq)} + NO_3^-{}_{(aq)}$

6. Match each name below with the following microscopic pictures of that compound in aqueous solution.

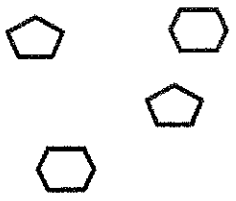
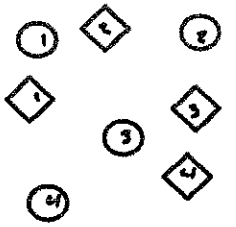
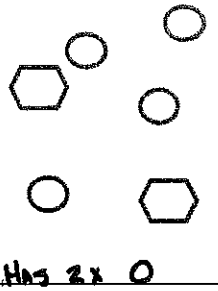
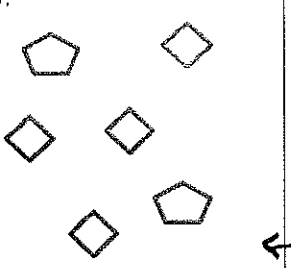
a. Barium nitrate → iv $Ba^{+2}(NO_3^{-1})_2$

b. Sodium chloride → ii Na^+Cl^-

c. Potassium carbonate→ iii $K_2^{+1}CO_3^{-2}$

d. Magnesium sulfate → i $Mg^{+2}SO_4^{-2}$

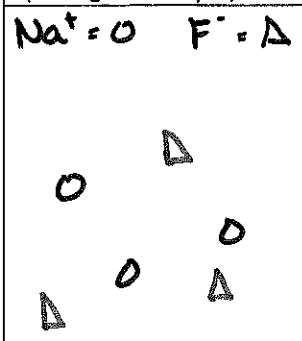
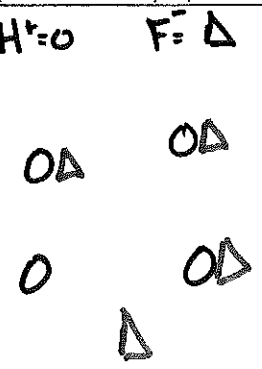
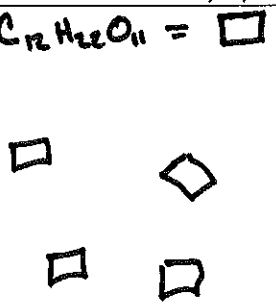
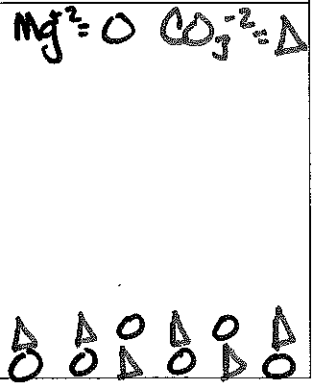
○ = 1+ ◇ = 1- ⬠ = 2+ ⬡ = 2-

i.	ii.	iii.	iv.
			

iii. K_2CO_3 Has 3x O

iv. △ Ba^{+2} 2x ◇ NO_3^- ← has 2x ◇

7. Draw particulate (microscopic) drawing of what happens when each of the following solutes are added to water.

a. NaCl (strong electrolyte)	b. HF (weak electrolyte)	c. $C_{12}H_{22}O_{11}$ (soluble nonelectrolyte)	d. $MgCO_3$ (insoluble compound)
			

$Na^+ = ○$ $F^- = △$

$H^+ = ○$ $F^- = △$

$C_{12}H_{22}O_{11} = □$

$Mg^{+2} = ○$ $CO_3^{-2} = △$

Even Amount

○ + △

$NaCl \rightarrow Na^+ + Cl^-$

more still Combined togeth

$HF \rightleftharpoons H^+ + F^-$

dissolves But stays as molecules

Solid at Bottom