## 1. Solution Types

Give 6 different types of solutions, with an example of each.

## 2. Polarity/Electronegativity

1. Define the following terms:
   a. Electronegativity

   b. Polarity

2. Explain how polar bonds are formed in terms of electronegativity.

**3. Disolving/Dissociation**

1. What is the difference in how ionic compounds dissolve versus how covalent compounds dissolve?

2. Write the balanced reaction showing the dissolving/dissociation of the following:
   a. $MgCl_{2(s)} \rightarrow$

   b. $CO_{2(g)} \rightarrow$

3. Which solution in #2 would conduct electricity?

## 4. Dissociation/Heat of Solution

1. Write the reaction showing the dissolving of the following solids (be sure to note whether they are covalent or ionic!). Include states.

   a. $Ca_3(PO_4)_{2(S)}$

   b. $CO_{2(g)}$

2. State whether each of the following is an endothermic or exothermic process, and whether it would feel hot or cold:

   a. Breaking bonds between solute molecules

   **b.** Breaking bonds between solvent molecules

   **c.** Forming new bonds between solvent molecules

## 5. Heat of Solution

State whether each of the following is an endothermic or exothermic process, and whether it would feel hot or cold:

a. Breaking bonds between solute molecules

**b.** Breaking bonds between solvent molecules

**c.** Forming new bonds between solvent molecules

## 6. Heat of solution

Explain how a hot pack works in terms of solution formation. Use the energy changes that occur during the breaking and forming of bonds to explain the process.

## 7. Solution Formation

1. Give 2 ways you can make a solid dissolve faster.

2. Give 2 ways you can make a solid dissolve more.

3. Write the dissociation reaction for magnesium chloride.

4. What is an electrolyte?

## 8. Solution Formation/Solubility Curves

1. Write the reaction showing the dissolving of the following:

   a) $AlCl_{3\,(s)}$

   b) $PCl_{3\,(s)}$

2. Use your solubility table to answer the following questions:

   a) 100 grams of water are saturated with sodium nitrate at 40°C. If this solution is heated to 70°C, how much more can be dissolved?

   b) How many grams of ammonium chloride will dissolve in 65g of water at 70°C?

   c) What is the solubility of sodium chloride in 100 grams of water at 50°C?

### 8. Solubility Curves

Use your solubility table to answer the following questions:

a) 100 grams of water are saturated with sodium nitrate at 40°C. If this solution is heated to 70°C, how much more can be dissolved?

b) How many grams of ammonium chloride will dissolve in 65g of water at 70°C?

c) What is the solubility of sodium chloride in 100 grams of water at 50°C?

### 9. Solubility Curves

**Use your solubility curve to answer the following:**

1. Which is more soluble - $NaNO_3$ or KCl?
2. How many grams of NH4Cl will dissolve in 100g of water at 90C
3. How many grams of NH4Cl will dissolve in 50g of water at 90C
4. A saturated solution of KNO3 in 400g of water at 50C is cooled to 10C. How much will come out of solution?

### 10. Solubility Curves

Use your solubility table to answer the following questions:

1. 100 grams of water are saturated with sodium nitrate at 40°C. If this solution is heated to 70°C, how much more can be dissolved?

2. How many grams of ammonium chloride will dissolve in 65g of water at 70°C?

3. What is the solubility of sodium chloride in 100 grams of water at 50°C?

### 11. Solubility Curves

Use your solubility graph to answer the following questions:

1. How many grams of potassium nitrate will dissolve in 100g of water at 60 degrees celsius?

2. A saturated solution of ammonium chloride at 90 degrees is cooled to 10 degrees celsius. How many grams of solute will precipitate (settle out)?

3. How many grams of sodium nitrate will dissolve in 60mL of water at 50 degrees celsius?

### 12. Molarity/Solution Preparation

1. 10g of LiCl is dissolved in 150mL of water. What is the molarity?

2. You want to make 500mL of 0.1mol/L LiCl solution.
   a) How many moles of LiCl are needed?

   b) How many grams of LiCl are needed?

3. You have 200mL of 0.1mol/L LiCl solution.
   a) how many moles of LiCl does it contain?

   b) How many grams of LiCl does it contain?

### 13. Molarity Calculations

1. Determine the concentration of 100mL of solution made with 10g of NaCl

2. What volume of 0.5mol/L NaCl solution contains 30 grams of salt?

3. 100mL of a 0.5mol/L solution is diluted by adding 500mL of water. Determine the new concentration.

## 14. Solution Preparation

**Describe** how you would use a 500ml volumetric flask to make 500ml of a 0.5mol/L solution of calcium hydroxide. (show any calculations)

## 15. Dilutions/Mixing Solutions

1. If 200mL of water is added to 300mL of 0.5mol/L NaCL solution, find the new concentration

2. If 100mL of 0.5mol/L salt solution is mixed with 200mL of a 0.1mol/L salt solution, what is the new concentration?

## 16. Dilutions/Mixing Solutions

1. 100mL of a 0.5mol/L solution has 400mL of water added to it. What is the new concentration?

2. 100mL of a 1.0mol/L NaCl solution is mixed with 900mL of a 5mol/L NaCl solution. What is the new concentration?

## 17. Solution Stoichiometry

Calculate the mass of zinc chloride produced when excess zinc metal reacts with 50ml of 3.0mol/L Hydrochloric acid (HCl)