**Chemistry 11 – Chapter 9 Review**

**PART I: VSEPR THEORY**

For each of the following compounds

a) Draw the Lewis diagram

b) Describe the intermolecular forces present

c) Give the bond angles

d) Give the shape name

1. SF2 2. NH3

3. SiS2 4. CHF3

5. BF3 6. COF2

**Part I Answers**

1. Bent, dipole dipole, 104.5°
2. Trigonal pyramidal, hydrogen, 107°
3. Linear, LDF, 180°
4. Tetrahedral, dipole dipole, 109.5°
5. Trigonal planar, LDF, 120°
6. Trigonal planar, dipole dipole, 120°

**PART II: LIKE DISSOLVES LIKE**

1. Classify each solute and solvent as polar or non-polar, and then predict which solvents will dissolve which solutes.

|  |  |  |  |
| --- | --- | --- | --- |
| **Solvent** | **Polar/Non-Polar** | **Solute** | **Polar/Non-Polar** |
| a) Water H2O |  | f) Acetic Acid CH3COOH |  |
| b) Methanol CH3OH |  | g) Chloroform CHCl3 |  |
| c) Ethanol CH3CH2OH |  | h) Carbon tetrachloride CCl4 |  |
| d) Benzene C6H6 |  | i) Heptane C7H16 |  |
| e) Acetone CH3COCH3 |  | j) Ammonia NH3 |  |

1. Which of the above would dissolve in water?

**Part II Answers:**

1. a) polar 2. All polar molecules

b) slightly polar

c) slightly polar

d) non-polar

e) slightly polar

f) polar

g) polar

h) non-polar

i) non-polar

j) polar (because of extra pair of electrons on N)

**PART III: SOLUTIONS**

1. Describe how to make 200 mL of a 0.65 M solution of LiI

2. How many grams of CaCl2 are contained in 1.25 L of a 0.25 M solution of CaCl2?

3. What is the molarity of a solution made from dissolving 15.6 g of CaI2 into 1900 mL of water?

4. 14.5 g of calcium chloride and 13.76 g of aluminum chloride are dissolved in order to make a solution that is 2.5 L. What is the chloride ion concentration in the final solution?

5. 2.5 L of a 0.96 M solution of Li2CO3 are added to 3.0 L of water. What are the final concentrations of the Li+ and CO32- ions after mixing?

6. What volume of 1.37 M sucrose can be made from 300 mL solution that is 2.7 M sucrose?

7. What are the concentrations of each of the ions of AlCl3 as 1.40 L of a 0.45 M solution is concentrated to 0.23 L?

8. What are the final concentration of all ions when 2.5 L of 1.56 M Fe2(CO3)3 is mixed with 1.9 L of 1.36 M KCl?

9. 200.0 mL of 1.60 M aluminum bromide is mixed with 3.0 L of 1.40 M Barium bromide. What is the final bromide ion concentration?

10. FeCl3(aq) is mixed with Sr(OH)2. Write out the molecular, complete ionic and net ionic equations for the reaction.

11. 0.967 L of 0.90 M FeCl2 is mixed with 1.10 L of 1.10 M Na2S. What are the concentrations of all of the ions after mixing, and what mass of precipitate forms?

**Answers:  
1**. 17 g   
**2**. 35 g   
**3**. 0.028 M   
**4**. 0.23 M   
**5**. [Li+]=0.87M, [CO32-]=0.44M   
**6**. 600 mL  
**7**. [Al3+]=2.7 M, [Cl-]=8.2 M   
**8**. [K+]=0.59M, [Cl-]=0.59M, [Fe3+]=1.7M, [CO32-]=2.7M   
**9.** 2.9M  
**10**. molecular: 2FeCl3(aq) + 3Sr(OH)2(aq) 🡪 2Fe(OH)3(s) + 3SrCl2(aq)   
 complete: 2Fe3+(aq) + 6Cl-(aq) + 3Sr2+(aq) + 6OH-(aq) 🡪 2Fe(OH)3(s) + 3Sr2+(aq) + 6Cl-(aq)  
 net: Fe3+(aq) + 3OH-(aq) 🡪 Fe(OH)3(s)   
**11.** [Cl-]=0.84M, [Na+]=1.2 M, [Fe2+]=0.0M, [S2-]=0.16M