w/s Soln review

1. Hydration is the process in which a molecule or ion is surrounded by water molecules arranged in a specific manner. Water's polarity enables its molecule to interact with ions in solution.

2. b/c tap H2O is not pure. It contains ions & minerals that can conduct electricity.

3. Na⁺ and SO₄²⁻

4. a) Strong electrolyte (100% dissociation) 
   b) Non-electrolyte (no dissociation) 
   c) Weak electrolyte (partial dissociation)

5. C. NaCl is a soluble ionic comp. so it completely ionizes in water. Na⁺ is attracted to the partial neg. side of water while Cl⁻ is attracted to the partial pos. side of water.

6. a) N  b) S  c) S  d) W  e) N  f) S

9. N  h) W  i) S
1. B & C only b/c the ions are free to move.

2. First measure the conductance of the solutions to see which carries an electrical current. To determine if it's strong or weak. Compare your results to a known strong electrolyte.

3. HCl does not ionize in benzene but it does in water.

4. \[0.707 \text{M } \text{NaNO}_3 = \frac{x \text{ mol } \text{NaNO}_3}{0.250 \text{ L soln}}\]

5. \[x = \frac{0.177 \text{ mol } \text{NaNO}_3}{85.00 \text{ g } \text{NaNO}_3} \times \frac{1 \text{ mol } \text{NaNO}_3}{1 \text{ mol } \text{NaNO}_3} = 15.05 \text{ g } \text{NaNO}_3\]

6. First mass 15.05 g of NaNO3 on an electronic balance, then add it to a 250-mL volumetric flask, fill 1/2 way w/DI H2O, swirl to dissolve most of solid, add DI H2O up to miniscus, invert before using.

7. 5.50 M KOH = \[\frac{x \text{ mol } \text{KOH}}{0.0350 \text{ L soln}}\]

8. \[x = \frac{0.193 \text{ mol } \text{KOH}}{50.11 \text{ g } \text{KOH}} \times \frac{1 \text{ mol } \text{KOH}}{1 \text{ mol } \text{KOH}} = 10.83 \text{ g } \text{KOH}\]
(12) a) \(0.57\, \text{g} \, \text{C}_2\text{H}_5\text{OH} \mid 1\, \text{mol} \, \text{C}_2\text{H}_5\text{OH} = 0.143 \, \text{mol} \text{C}_2\text{H}_5\text{OH} \)

\[ M = \frac{\text{mol}}{L} \quad \frac{0.143 \, \text{mol}}{0.545 \, \text{L}} = 0.262 \, \text{M} \]

b) \(15.4\, \text{g} \, \text{CaCl}_2 \mid 1\, \text{mol} \, \text{CaCl}_2 = 0.139 \, \text{mol} \, \text{CaCl}_2 \)

\[ M = \frac{0.139 \, \text{mol}}{0.220 \, \text{L}} = 0.632 \, \text{M} \]

\(\times 0.631\) if first part is in rounded

(13) a) \(0.100\, \text{M} = \frac{x \, \text{mol} \, \text{CsI}}{0.250 \, \text{L}}\)

\[ x = \frac{0.0250 \, \text{mol} \, \text{CsI}}{259.81 \, \text{g} \, \text{CsI}} = \frac{0.509 \, \text{g} \, \text{CsI}}{\text{CsI}} \]

b) \(0.0250\, \text{mol} \, \text{H}_2\text{SO}_4 \mid 1\, \text{mol} \, \text{H}_2\text{SO}_4 \)

\(\frac{98.09 \, \text{g} \, \text{H}_2\text{SO}_4}{\text{gH}_2\text{SO}_4} = 2.45 \, \text{g} \, \text{H}_2\text{SO}_4\)
c) \[ 0.0250 \text{ mol Na}_2\text{CO}_3 \div 1 \text{ mol Na}_2\text{CO}_3 = \frac{2.165 \text{ g Na}_2\text{CO}_3}{105.99 \text{ g Na}_2\text{CO}_3} \]

d) \[ 0.0250 \text{ mol K}_2\text{Cr}_2\text{O}_7 \div 1 \text{ mol K}_2\text{Cr}_2\text{O}_7 = \frac{10.1 \text{ g K}_2\text{Cr}_2\text{O}_7}{158.04 \text{ g K}_2\text{Cr}_2\text{O}_7} \]

e) \[ 0.0250 \text{ mol KMnO}_4 \div 1 \text{ mol KMnO}_4 = \frac{3.95 \text{ g KMnO}_4}{158.04 \text{ g KMnO}_4} \]

14) **dilution** \[ M_1 V_1 = M_2 V_2 \]

\[(0.866 \text{ M})(250 \text{ mL}) = M_2 (500 \text{ mL}) \]

\[ M_2 = 0.0433 \text{ mol/L} \]

15) \[(505 \text{ mL})(0.125 \text{ M}) = (0.100 \text{ M})(V_2) \]

\[ V_2 = 63 \text{ mL total soln} - 505 \text{ mL initial soln} = 126 \text{ mL of DI H}_2\text{O to be added} \]

16) **This is NOT** a dilution problem but you must first figure out what your starting soln is. Remember \[ M = \frac{\text{moles}}{L} \]

How many moles are in your final soln?

\[ 0.568 \text{ M} = \frac{x \text{ mol}}{0.0410 \text{ L}} \]

\[ x = 0.0262 \text{ mol} \]

\[ 1.390 \text{ M} = \frac{x \text{ mol}}{0.0805 \text{ L}} \]

\[ x = 0.112 \text{ mol} \]

total moles \[ = 0.0262 + 0.112 = 0.138 \text{ mol} \]

What volume is your final soln? \[ 46.2 \text{ mL} + 80.5 \text{ mL} = 126.7 \text{ mL} \]