Quiz 9A

Question 1. At 26 °C, the solubility of sodium chloride is 36 g/100 mL of solution. How would you describe a solution of 10 g of sodium chloride in 100 mL of solution at room temperature (2 points)?

 $\frac{10 g NaCl}{100 mL solution}<\frac{36 g NaCl}{100 mL solution}$; Therefore the solution is unsaturated.

Question 2. Indicate whether each of the following compounds dissolves in water to give ions, molecules or both (3 points).

1. NaCl, a strong electrolyte \_\_\_\_\_\_\_\_ions\_\_\_\_\_\_\_\_\_\_
2. CH3CH2OH, a nonelectrolyte \_\_\_\_\_\_\_\_molecules\_\_\_\_\_\_\_
3. H2CO3, a weak electrolyte \_\_\_\_\_\_\_\_both\_\_\_\_\_\_\_\_\_\_

Question 3. How many grams of sodium hydroxide, NaOH, are needed to make a 250.0 mL solution that is 0.536 M (5 points)?

$$250.0 mL×\frac{1 L}{1000 mL}×\frac{0.536 mol NaOH}{1 L}×\frac{40.00 g NaOH}{1 mol NaOH}=5.36 g NaOH$$

Question 4. What volume of concentrated sulfuric acid solution (18 M) is needs to make 2.0 L of 1.5 M dilute solution (5 points)?

V1 = ?

M1 = 18 M

V2 = 2.0 L

M2 = 1.5 M

$$M\_{1}V\_{1}=M\_{2}V\_{2}⇒V\_{1}=V\_{2}\frac{M\_{2}}{M\_{1}}=\left(2.0 L\right)\left(\frac{1.5 M}{18 M}\right)=0.17 L$$

Question 5. If 29.54 mL of a barium hydroxide solution completely reacts with 12.67 mL of a 0.328 M hydrochloric acid solution, what is the molarity of the barium hydroxide solution? Given the unbalanced equation (5 points):

Ba(OH)2 (aq) + 2 HCl (aq) 🡪 BaCl2 (aq) + 2 H2O (l)

$12.67 mL HCl soln×\frac{0.328 mmol HCl}{1 mL HCl soln}×\frac{1 mmol Ba(OH)\_{2}}{2 mmol HCl}×\frac{1}{29.54 mL Ba(OH)\_{2} soln}=0.0703 M Ba(OH)\_{2}$

Quiz 9B

Question 1. What volume of concentrated nitric acid solution (16 M) is needs to make 0.55 L of 6.0 M dilute solution (5 points)?

V1 = ?

M1 = 16 M

V2 = 0.55 L

M2 = 6.0 M

$$M\_{1}V\_{1}=M\_{2}V\_{2}⇒V\_{1}=V\_{2}\frac{M\_{2}}{M\_{1}}=\left(0.55 L\right)\left(\frac{6.0 M}{16 M}\right)=0.21 L$$

Question 2. At 26 °C, the solubility of sodium chloride is 36 g/100 mL of solution. How would you describe a solution of 15 g of sodium chloride in 100 mL of solution at room temperature (2 points)?

 $\frac{15 g NaCl}{100 mL solution}<\frac{36 g NaCl}{100 mL solution}$; Therefore the solution is unsaturated.

Question 3. How many grams of potassium chloride, KCl, are needed to make a 50.00 mL solution that is 0.153 M (5 points)?

$$50.00 mL×\frac{1 L}{1000 mL}×\frac{0.153 mol KCl}{1 L}×\frac{74.55 g KCl}{1 mol KCl}=0.570 g KCl$$

Question 4. If 15.44 mL of a calcium hydroxide solution completely reacts with 18.01 mL of a 0.125 M nitric acid solution, what is the molarity of the calcium hydroxide solution? Given the unbalanced equation (5 points):

Ca(OH)2 (aq) + 2 HNO3 (aq) 🡪 Ca(NO3)2 (aq) + 2 H2O (l)

$18.01 mL HNO\_{3} soln×\frac{0.125 mmol HNO\_{3}}{1 mL HNO\_{3} soln}×\frac{1 mmol Ca(OH)\_{2}}{2 mmol HNO\_{3}}×\frac{1}{15.44 mL Ca(OH)\_{2} soln}=0.0729 M Ca(OH)\_{2}$

Question 5. Indicate whether each of the following compounds dissolves in water to give ions, molecules or both (3 points).

1. KNO3, a soluble salt \_\_\_\_\_\_\_\_ions\_\_\_\_\_\_\_\_\_\_
2. HF, a weak electrolyte \_\_\_\_\_\_\_\_both\_\_\_\_\_\_\_\_\_\_
3. Glucose, a nonelectrolyte \_\_\_\_\_\_\_\_molecules\_\_\_\_\_\_\_