Quiz 11A

Question 1. Identify the following components of the net ionic equation below:

H3PO4 (aq) + H2O (l) $⇌$ H3O+ (aq) + H2PO4- (aq) (4 points)

1. Acid \_\_\_\_\_H3PO4\_\_\_\_\_\_\_\_\_\_
2. Conjugate acid \_\_\_\_\_H3O+\_\_\_\_\_\_\_\_\_\_
3. Base \_\_\_\_\_H2O\_\_\_\_\_\_\_\_\_\_
4. Conjugate base \_\_\_\_\_H2PO4-\_\_\_\_\_\_\_\_\_\_

Question 2. A 25.0 mL sample of phosphoric acid requires 50.0 mL of 1.50 M sodium hydroxide for complete neutralization. What is the molarity of the acid given the unbalanced equation (6 points):

H3PO4 (aq) + 3 NaOH (aq) 🡪 Na3PO4 (aq) + 3 H2O (l)

$$50.0 mL NaOH soln×\frac{1.50 mmol NaOH}{1 mL NaOH soln}×\frac{1 mmol H\_{3}PO\_{4}}{3 mmol NaOH}×\frac{1}{25.0 mL H\_{3}PO\_{4} soln }=1.00 M H\_{3}PO\_{4}$$

Question 3. A sample of acid rain has a pH of 4.20 (6 points).

1. Calculate the [H3O+].

$$\left[H\_{3}O^{+}\right]=10^{-pH}=10^{-4.20}=6.3×10^{-5} M$$

1. Calculate the pOH.

$$pH+pOH=14⇒pOH=14-pH=14-4.20=9.80$$

1. Calculate the [OH-].

$$K\_{w}=\left[H\_{3}O^{+}\right]\left[OH^{-}\right]⇒\left[OH^{-}\right]=\frac{K\_{w}}{\left[H\_{3}O^{+}\right]}=\frac{1×10^{-14}M^{2}}{6.3×10^{-5} M}=1.6×10^{-10}M$$

Question 4. Name the following compounds (4 points):

1. CBr4 \_\_\_\_\_\_carbon tetrabromide\_\_\_\_\_\_\_\_\_\_\_\_
2. HF (aq) \_\_\_\_\_\_hydrofluoric acid \_\_\_\_\_\_\_\_\_\_\_\_\_
3. KOH \_\_\_\_\_\_potassium hydroxide\_\_\_\_\_\_\_\_\_\_\_\_\_
4. HNO3 (aq) \_\_\_\_\_\_nitric acid\_\_\_\_\_\_\_\_\_\_\_\_\_

Quiz 11B

Question 1. Name the following compounds (4 points):

1. HClO3 \_\_\_\_\_\_chloric acid\_\_\_\_\_\_\_\_\_\_\_\_
2. HBr (aq) \_\_\_\_\_\_hydrobromic acid\_\_\_\_\_\_\_\_\_\_\_\_
3. Mg(OH)2 \_\_\_\_\_\_magnesium hydroxide\_\_\_\_\_\_\_\_\_\_\_\_
4. CF4 \_\_\_\_\_\_carbon tetrafluoride \_\_\_\_\_\_\_\_\_\_\_\_

Question 2. A 10.0 mL sample of phosphoric acid requires 20.0 mL of 2.25 M sodium hydroxide for complete neutralization. What is the molarity of the acid given the unbalanced equation (6 points):

H3PO4 (aq) + 3 NaOH (aq) 🡪 Na3PO4 (aq) + 3 H2O (l)

$$20.0 mL NaOH soln×\frac{2.25 mmol NaOH}{1 mL NaOH soln}×\frac{1 mmol H\_{3}PO\_{4}}{3 mmol NaOH}×\frac{1}{10.0 mL H\_{3}PO\_{4} soln }=1.50 M H\_{3}PO\_{4}$$

Question 3. A sample of acid rain has a pH of 3.524 (6 points).

1. Calculate the [H3O+].

$$\left[H\_{3}O^{+}\right]=10^{-pH}=10^{-3.524}=2.99×10^{-4} M$$

1. Calculate the pOH.

$$pH+pOH=14⇒pOH=14-pH=14-3.524=10.476$$

1. Calculate the [OH-].

$$K\_{w}=\left[H\_{3}O^{+}\right]\left[OH^{-}\right]⇒\left[OH^{-}\right]=\frac{K\_{w}}{\left[H\_{3}O^{+}\right]}=\frac{1×10^{-14}M^{2}}{2.99×10^{-4}}=3.34×10^{-11}M$$

Question 4. Identify the following components of the net ionic equation below:

SO42- (aq) + H2O (l) $⇌$ HSO4- (aq) + OH- (aq) (4 points)

1. Acid \_\_\_\_\_ H2O \_\_\_\_\_\_\_\_\_\_
2. Conjugate acid \_\_\_\_\_ HSO4-\_\_\_\_\_\_\_\_\_\_
3. Base \_\_\_\_\_ SO42-\_\_\_\_\_\_\_\_\_\_
4. Conjugate base \_\_\_\_\_ OH-\_\_\_\_\_\_\_\_\_\_