Acid-Base Reactions Worksheet #3

1. 1.00 g of oxalic acid dihydrate, $H_2C_2O_4 \bullet 2\ H_2O$, is neutralized when 33.24 mL of sodium hydroxide is added.

   a) How many equivalents are involved in this reaction?

   $$1.00\ g\ (mol/126\ g)(2\ eq/mol) = 1.58\ x10^{-2}\ eq$$

   b) What is the Normality of the base? What is the Molarity of the base?

   $$1.58\ x10^{-2}\ eq/0.03324\ L = N = 0.475$$

2. 45.76 mL of 0.250 M hydroiodic acid is added to 2.09 g of barium hydroxide. Is the solution acidic or basic? What is the concentration of hydronium and hydroxide ions in this solution?

   $$(0.04576\ L)(0.250\ mol/L)(eq/mol) = 1.14\ x10^{-2}\ eq_a$$
   $$(2.09\ g\ Ba(OH)_2)(mol/171\ g)(2\ eq/mol) = 2.44\ x10^{-2}\ eq_b$$

   $2.44\ x10^{-2} - 1.14\ x10^{-2} = 1.30\ x10^{-2}\ eq_b$ solution is basic

   $$(1.30\ x10^{-2}/0.04576\ L) = [OH^-] = 0.284$$
   $$1.0\ x10^{-14}/0.284 = [H_3O^+] = 3.52\ x10^{-14}$$