Honors Chemistry
Ms. Ye

Name _____
Date _____Period_____

Do Now: Review

1. When an acid is dissolved in water, it forms _____ ions
2. When a base is dissolved in water, it forms _____ ions

Neutralization Reaction: When

_____

Consider the Reaction between Acetic Acid and Sodium Hydroxide:

H$C_2H_3O_2$ + Na**OH** → _____ + _____

1. What is the neutral compound that is formed when an acid and base react?

2. What is the second compound that is formed?

**Every Neutralization Reaction Involves:

_____ + _____ → _____ + _____ (_____)

Neutralization reactions are_____!

Practice Writing Neutralization Reactions

1. HNO_3 + KOH →_____ + _____
2. HCl + NaOH →_____ + _____
3. HBr + KOH →_____ + _____
4. H_2SO_4 + $Ba(OH)_2$ →_____ + _____
5. H_2SO_4 + 2 _____ → 2 _____ + K_2SO_4
6. 2 HNO_3 + _____ → 2 _____ + $Ca(NO_3)_2$
7. H_3PO_4 + 3 KOH → 3 _____ + _____

Titration-a method used to calculate the _____ of an unknown _____
**Acid of known concentration is added to a base of unknown concentration, or vice versa.

When the moles of _____= moles of _____, the solution is _____ and the titration is complete.

Example: Antacids can help neutralize stomach acid when you have an upset stomach. Assume that the molarity of the HCl in your stomach acid is 0.15 M and that the volume of acid is 100 mL. You dissolve an antacid tablet in water and the molarity of the basic solution is 0.2M. How much of the basic (antacid) solution would you need to neutralize the HCl?

Titration	$M_AV_A = M_BV_B$	M_A = molarity of H^+	M_B = molarity of OH^-
		V_A = volume of acid	V_B = volume of base

$\mathrm{M_A}V_A = \mathrm{M_B}V_B$

$(0.15\ \mathrm{M}) \times (100\ mL) = (0.2\ \mathrm{M}) \times V_B$

$\boldsymbol{V_B = 75\ mL}$

1. What is the concentration of a solution of HI if 0.3 L is neutralized by 0.6 L of 0.2 M solution of KOH?
   M_A=

   V_A=

   M_B=

   V_B=

2. What is the concentration of a hydrochloric acid solution if 50.0 mL of a 0.250 M KOH solution are needed to neutralize 20.0 mL of the HCl solution of unknown concentration?
   M_A=

   V_A=

   M_B=

   V_B=

3. A particular acid has an H+ concentration of 0.1 M and a volume of 100 mL. What volume of a base with a 0.5 M OH- concentration will be required to neutralize the reaction?
   M_A=

   V_A=

   M_B=

   V_B=

Neutralization Multiple Choice Questions:

1. Which word equation represents a neutralization reaction?
   A. Base + acid → salt + water
   B. Base + salt → water + acid
   C. Salt + acid → base + water
   D. Salt + water → acid + base

2. Which equation represents a neutralization reaction?
   A. 4 Fe (s) + 3 O_2(g) → 2 Fe_2O_3 (s)
   B. 2 H_2 (g) + O_2 (g) → 2 H_2O (l)
   C. HNO_3(aq) + KOH(aq) → KNO_3(aq) + H_2O(l)
   D. $AgNO_3$(aq) + KCl (aq) → KNO_3(aq) + AgCl (s)

3. Sulfuric acid, H_2SO_4 (aq), can be used to neutralize barium hydroxide, $Ba(OH)_2$ (aq). What is the formula for the salt produced by this neutralization?
   A. BaS
   B. $BaSO_2$
   C. $BaSO_3$
   D. $BaSO_4$

4. What are the products of a reaction between KOH(aq) and HCl (aq)?
   A. H_2 and KClO
   B. H_2O and KCl
   C. KH and HClO
   D. KOH and HCl

5. Which reactants form the salt $CaSO_4(s)$ in a neutralization reaction?
   A. $H_2S(g)$ and $Ca(ClO_4)_2$ (s)
   B. $H_2SO_3(aq)$ and $Ca(NO_3)_2$ (aq)
   C. $H_2SO_4(aq)$ and $Ca(OH)_2$ (aq)
   D. $SO_2(g)$ and $CaO(s)$

6. What volume of 0.120 M $HNO_3(aq)$ is needed to completely neutralize 150.0 milliliters of 0.100 M NaOH?
   A. 62.5 mL
   B. 125 mL
   C. 180. mL
   D. 360. mL

7. A 25.0-milliliter sample of $HNO_3(aq)$ is neutralized by 32.1 milliliters of 0.150 M KOH(aq). What is the molarity of the $HNO_3(aq)$?
   A. 0.117 M
   B. 0.150 M
   C. 0.19 M
   D. 0.300 M

8. How many milliliters of 0.600 M H_2SO_4 are required to exactly neutralize 100. milliliters of 0.300 M $Ba(OH)_2$?
   A. 25.0 mL
   B. 50.0 mL
   C. 100. mL
   D. 200. mL

9. A student neutralized 16.4 milliliters of HCl by adding 12.7 milliliters of 0.620 M KOH. What was the molarity of the HCl acid?
   A. 0.168 M
   B. 0.480 M
   C. 0.620 M
   D. 0.801 M

10. Which volume of 2.0 M NaOH (aq) is needed to completely neutralize 24 milliliters of 1.0 M HCl(aq)?
   A. 6.0 mL
   B. 12 mL
   C. 24 mL
   D. 48 mL