Dougherty Valley HS AP Chemistry
Acid Base Reactions Review
Questions

QUICK CHECK #4

Name: **Date:** **Period:** **Seat #:**

1. Which statement is a logical consequence of the fact that a 0.10 molar solution of potassium acetate, $KC_2H_3O_2$, is less basic than a 0.10 molar solution of potassium cyanide, KCN?
   (A) Hydrocyanic acid (HCN) is a weaker acid than acetic acid.
   (B) Hydrocyanic acid is less soluble in water than acetic acid.
   (C) Cyanides are less soluble than acetates.
   (D) Acetic acid is a weaker acid than hydrocyanic acid.

2. Which solution would show the least change in pH upon addition of 3.0 mL of 1.0 M KOH? (Assume equal volumes of each solution are used. Ka for $HC_2H_3O_2 = 1.8 \times 10^{-5}$)
   (A) A solution that is 0.50 M acetic acid and 0.50 M sodium acetate.
   (B) A solution that is 0.10 M acetic acid and 0.10 M sodium acetate.
   (C) A solution that is 1.0 M acetic acid.
   (D) A solution that is 0.50 M sodium acetate.

3. A strong monoprotic acid is being titrated with a 0.500 M NaOH solution. Which statement is true for this titration?
   (A) The pH at the equivalence point cannot be determined without knowing the identity of the acid.
   (B) The pH at the equivalence point cannot be determined unless the concentration of the acid is known.
   (C) The pH at the equivalence point depends on neither the identity of the acid nor the concentration of the acid.

4. Which of the following would not make a good buffering system?
   (A) SO_4^{2-} and H_2SO_4 (B) HCO_3^- and H_2CO_3
   (C) NH_3 and NH_4^+ (D) CH_3COO^- and CH_3COOH

5. The amount (in grams) of sodium acetate (MW = 82.0) to be added to 500.0 mL of 0.200 molar acetic acid ($K_a = 1.80 \times 10^{-5}$) in order to make a buffer with pH = 5.000 is
   (A) 69 (B) 0.180 (C) 14.9 (D) 29.5 (E) None of these

6. Determine the pH of a solution in which 1.00 mol H_2CO_3 ($K_a = 4.2 \times 10^{-7}$) and 1.00 mole $NaHCO_3$ are dissolved in enough water to form 1.00 L of solution.

7. How many grams of $Mg(OH)_2$ are required to neutralize 50.0 ml of a 3.00 M HCl solution?

8. A sample of 20.0 mL of a 0.100-molar HCN solution is titrated with a 0.150-molar NaOH solution. (K_a HCN = 6.2×10^{-10})
   (A) What volume of NaOH is used in the titration in order to reach the equivalence point?
   (B) What is the molar concentration of CN^- at the equivalence point?
   (C) What is the pH of the solution at the equivalence point?

ANSWERS: A/A/C/A/C/6.4/4.37/a. 0.0133L/b. 0.060M/c. 11.0