Quiz: Ch 17 **Name:**
Version B (33 pts) **Period (circle): 6 7**
AP Chemistry **Date:**

Show your work for all questions; answer all parts of all questions. No work = no credit. If you are making an assumption, be sure to note what your assumption is.

1. (11 pts) A buffer solution contains 0.60 mole of nitrous acid, HNO_2, and 0.40 mole of sodium nitrite, $NaNO_2$, in 0.50 L of solution. The ionization constant, K_a, of nitrous acid is 4.5×10^{-4}.
   a. (3 pts) Calculate the pH of this solution.

   b. (2 pts) If 100. mL of this buffer solution is diluted to a volume of 1.00 L with pure water, the pH does not change. Briefly discuss why the pH remains constant on dilution.

   c. (3 pts) A 10.00 mL sample of 0.800 M HCl is added to 100. mL of the <u>original</u> buffer solution. Calculate the pH of the resulting solution.

   d. (3 pts) A 700. mL sample of 2.50 M nitrous acid is mixed with 120. mL of 5.20 M NaOH. Calculate the pH of the resulting solution.

2. (4 pts) Will a precipitate form when 175.0 mL of 0.040 M $BaCl_2$ and 210. mL of 0.080 M Na_2SO_4 are mixed together? (K_{sp} $BaSO_4 = 1.5 \times 10^{-9}$)

3. (18 pts) A 100.0 mL sample of 0.100 M $HONH_2$ ($K_b = 1.1 \times 10^{-8}$) is titrated with a 0.200 M $HClO_4$ solution. Calculate the pH after the following volumes of acid have been added:
   a. 0.0 mL

   b. 15.0 mL

   c. 30.0 mL

   d. 50.0 mL

   e. 70.0 mL

   f. 100.0 mL.