

**A buffer contains 0.2 mol of acetic acid and 0.4 mol of sodium acetate per liter ( $K_a = 1.8 \times 10^{-5}$ ).**

**(a) Calculate the pH of the buffer.**

**(b) Calculate the change in pH when 10 mL of 0.2 M HCl is added to 1 L of the buffer.**

**(c) What pH change would you expect if you added the same quantity of HCl to 1 L of pure water?**