1. What will be the pH of a carbonic acid buffer containing 90% bicarbonate (HCO₃⁻) and 10% carbonic acid (H₂CO₃)? The pKa of carbonic acid is 6.8.

2. What volume of 2.0 M sodium dihydrogen phosphate and of 2.0 M sodium mono-hydrogen phosphate would you use to make 500 mL of 0.02 M phosphate buffer, pH 7.5? Assume a pKa for dihydrogen phosphate of 6.86.

3. A student prepares a 0.2 M acetic acid buffer at pH 4.6.
   a. What is the ratio of A⁻ to HA in this buffer?
   b. What volume of this buffer would be needed to prepare 200 mL of 0.05 M acetic acid buffer at the same pH?
4. 3.224 g of sodium acetate were combined with 5.8 mL of glacial acetic acid in a total volume of 100 mL. The density of glacial acetic acid is 1.05 g/mL.

   a. What are the total moles of buffer?

   b. What is the molarity of the buffer?

   c. What is the pH of the buffer?