

## More Buffer Problems

1. A biochemist must prepare a solution as a medium in an experiment involving acid-producing bacteria. The pH of the medium must not change by more than 0.05 pH units for every 0.0010 mol  $\text{H}_3\text{O}^+$  generated by the organisms per liter of medium. A medium consisting of 0.10 M HA and 0.10 M  $\text{A}^-$  is prepared with a total volume of 1.0 L. Will the buffer capacity be sufficient for this experiment?
2. A 1.00-L buffer is prepared that is 0.2000 M in the weak acid, HA, and 0.1500 M in the weak base NaA. The buffer has a pH of 3.35. What is the  $\text{pK}_a$  for the weak acid? Is this buffer better at neutralizing strong acid or strong base? What is the buffer's capacity to neutralize strong acid? What is the buffer's capacity to neutralize strong base? What is the buffer's pH if 0.0015 mol NaOH is added to 0.5000 L of the buffer?
3. An environmental chemist needs a carbonate buffer of pH 10.00 to study the effects of the acidification of limestone-rich soils. How many grams of  $\text{Na}_2\text{CO}_3$  must she add to 1.5 L of freshly prepared 0.20 M  $\text{NaHCO}_3$  to prepare this buffer?