

1. Define a buffer solution. Why buffer solution is important?
2. Which of the following mixture(s) is an example of a buffer solution?
 - (a) NH_4NO_3 and HNO_3
 - (b) KCl and HCl
 - (c) Na_2HPO_4 and Na_3PO_4
 - (d) NaNO_2 and HNO_2
3. Consider a buffer that is 0.100 M HF and 0.100 M NaF .
 - a. Specifically identify the component in the buffer neutralizes any added acid, HBr ? Write a net-neutralization reaction.
 - b. Specifically identify the component in the buffer neutralizes any added base, KOH? Write a net-neutralization reaction.
3. Define the buffer capacity? How does the concentration of weak acid and conjugated acid affect the buffer capacity?
4. **Derive** the Henderson-Hasselbalch Equation and what can it tell us in the laboratory?

5. Explain why the pH at the equivalence point is greater than 7.00 for weak acid and strong base?

6. After the equivalence point, the curve is similar in both strong acid/strong base titration and weak acid/strong base titration. Why?

7. Both titration curves of strong acid vs. strong base and weak acid vs. strong base start at a low pH, so how can you distinguish the difference between them?

8. A friend of yours has performed three titrations: strong acid-strong base, weak acid-strong base and weak base-strong acid. He hands you the three titration curves, saying he has forgotten which is which. Draw (DO NOT COPY AND PASTE PICTURES) the three titration curves and label everything clearly.