

What kind of problem is it?

Weak acid	Lewis structure of weak acid , circle the acidic proton.
acetic acid $K_a = 1.8 \times 10^{-5}$	
formic acid $K_a = 1.8 \times 10^{-4}$	
carbonic acid $K_a = 4.5 \times 10^{-7}$	
hydrogen carbonate $K_a = 4.7 \times 10^{-11}$	
phosphoric acid $K_a = 7.1 \times 10^{-3}$	
dihydrogen phosphate $K_a = 6.3 \times 10^{-8}$	
hydrogen phosphate $K_a = 4.5 \times 10^{-13}$	

For each question, give the balanced chemical equation, the type of problem and the equation(s) you will use to solve it.

1. What is the pH of a 0.02 M solution of hydrochloric acid?
2. What is the pH when 30 ml of 1M hydrochloric acid is added to 200 mL of distilled water?

3. What is the pH of a 0.003M solution of sodium hydroxide?

4. What is the pH when 10 ml of 0.1M sodium hydroxide is mixed with 10 mL of 0.1M hydrochloric acid?

5. What is the pH of a 0.12M solution of acetic acid?

6. What is the pH when 25ml of 0.1M solution of acetic acid is added to 200mL of distilled water?

7. What is the pH when 10mL of 0.1M sodium hydroxide has been added to 25ml of 0.12M formic acid.

8. What is the new pH when 25mL of 0.1M hydrochloric acid is added to 25 ml of 0.1M acetic acid?

9. What is the pH of a buffer that is made by mixing 3.4g of sodium hydrogen phosphate and 4.5 g of sodium dihydrogen phosphate?

10. What is the new pH when 10 mL of 0.1M hydrochloric acid is added to 200 mL of a 0.1M pH 7.0 phosphate buffer?