

Some Practice Problems

1. Calculate pH, pOH and OH⁻ for a .0200 M soln. of HCl.

$$\text{PH} = 1.7$$

$$\text{POH} = 12.3$$

$$\text{Hydroxide} = 5.01 \times 10^{-13}$$

2. Calculate pH, pOH and OH⁻ for a .0200 M soln. of acetic acid. Identify the conjugate acid and base. Why is this pH different than that of HCl?

$$\text{Hydronium} = 5.92 \times 10^{-4}$$

$$\text{PH} = 3.23$$

$$\text{pOH} = 10.77$$

$$\text{Hydroxide} = 1.70 \times 10^{-11}$$

Acetic acid is a weak acid and does not completely ionize, so the concentration of hydronium ions is not as high as in HCl which is a strong acid and completely ionizes.

3. Calculate pOH, pH, and hydronium ion conc. for a .500 M solution of NH₄Cl.

$$\text{Hydronium} = 1.70 \times 10^{-5}$$

$$\text{pH} = 4.77$$

$$\text{Hydroxide} = 5.9 \times 10^{-10}$$

$$\text{pOH} = 9.23$$

4. 20.0 ml of .200 M ammonium hydroxide are mixed with 40.0 ml of .200 M hydrochloric acid. What will be the pH of the mixture?

$$\text{PH} = 1.18$$

5. Calculate the pH of a solution which contains .0400M HF and .600M NaF. K_a for HF is 6.61×10^{-4} .

$$\text{PH} = 4.4$$

6. 100.0 ml of .500 M HOAc are combined with 5.00 grams of potassium acetate. What will be the pH of the mixture?

$$\text{PH} = 4.76$$

7. What is the pH of a .02 M LiOH solution?

PH = 12.3

8. What is the pH of a solution which contains .2 M hypochlorous acid and .2 M potassium hypochlorite?
(I used 3.16×10^{-8} as the K_a of HClO)

pH = 7.5

9. What would the acetate ion concentration need to be in order to create a solution of .2 M HOAc with a 4.5 pH?

Find the necessary hydronium ion concentration by using the pH. (3.16×10^{-5})

.11 M is the concentration needed.

10. 40 ml of .2 M acetic acid are mixed with 30 ml of .2 M sodium hydroxide. What is the pH of the resulting solution?

PH = 5.23

11. 40 ml of .04 M sulfuric acid are mixed with 80 ml of .08 M sodium hydroxide. What is the pH of the resulting mixture?

PH = 12.43

12. What is the % ionization of the acid in problem 3?

.0034 %