

Biochemistry: Acids and bases  
Homework for video (2)  
Answers in video (3)

1. What concept is measured in liters? What is the abbreviation for liters?
2. What concept is measured in moles? What is the abbreviation for moles?
3. What concept does molarity measure? What is the abbreviation for molarity? What are the subunits for molarity?
4. What does "molar" mean?
5. What does "[Mg<sup>2+</sup>]" mean?
6. (a) If a 4.3 L solution contains  $8.2 \times 10^{-3}$  moles of Cl<sup>-</sup>, then what is the concentration of Cl<sup>-</sup>?  
(b) If a 3.4 L solution contains  $2.8 \times 10^{-3}$  M Cl<sup>-</sup>, then how many moles of Cl<sup>-</sup> are in the solution?
7. (a) Rewrite this equation without the "log symbol":  $\log w = v$   
(b) As  $w$  increases, what happens to  $\log w$ ?
8. Find the following without using a calculator:
  - (a)  $\log 10^{-4}$
  - (b)  $\log 100$
  - (c)  $\log 10$
  - (d)  $\log 1$
  - (e)  $\log 0$
  - (f)  $\log -4$For the remaining questions you can use a calculator.
9. (a) Determine  $\log (3.7 \times 10^{-6})$ .  
(b) Solve for  $y$ :  $\log (4.3 \times 10^{-2}) = y$   
(c) Solve for  $y$ :  $\log y = 7.2$
10. (a) Write the chemical equation for water autoionization.  
(b) Write the mathematical equation for water autoionization.
11. What is the value of  $K_w$ ? What are the units?

12. (a) What is the concentration of protons in pure water? Is the solution acidic or basic?

(b) What is the concentration of hydroxide in a solution that is  $5.2 \times 10^{-3} \text{ M H}^+$ ? Is the solution acidic or basic?

(c) What is the concentration of protons in a solution that is  $2.5 \times 10^{-4} \text{ M HO}^-$ ? Is the solution acidic or basic?

13. A solution has  $4 \times 10^{-9} \text{ M H}^+$ . What is the pH?

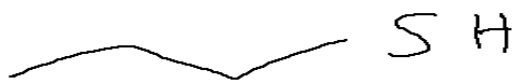
14. A solution has  $3.2 \times 10^{-4} \text{ M HO}^-$ . What is the pH?

15. Write the general chemical equation for acid ionization.

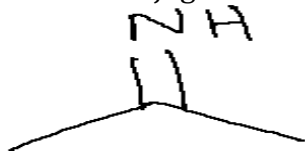
16. A solution is  $0.0023 \text{ M HBr}$ . What is the pH?

17. (a) Write the conjugate base of  $\text{HNO}_3$ .

(b) Write the conjugate base of



(c) Write the conjugate acid of



(d) Write the conjugate base of  $\text{H}_2\text{SO}_4$ .

(e) Write the conjugate base of  $\text{HSO}_4^-$ .

18. Relatively stronger acids have relatively \_\_\_\_\_ conjugate bases.  
(stronger or weaker?)

19. Relatively stronger acids have relatively \_\_\_\_\_  $K_a$  values.  
(larger or smaller?)

20. What is the  $K_a$  of a strong acid (in the absolute sense)?

21. Reexpress:  $\log(pq)$

22. What are the common strong acids and strong bases?

23. A solution has  $\text{pH} = 7.4$ . What is the proton concentration?