

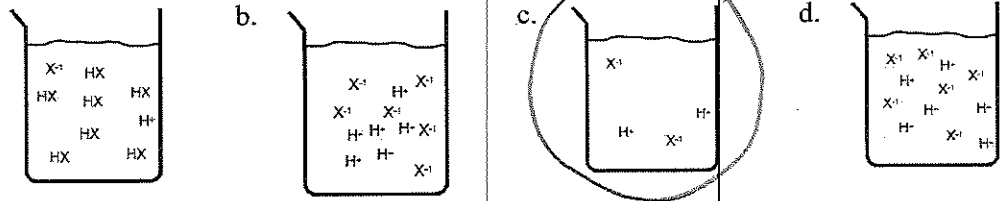
A8

Preliminary Quiz 11

1. (#8-1) A solution of $Pb(OH)_2$ is slightly basic. Which of the following reactions is producing this pH?
- a. $Pb(OH)_2 + H_2O \rightleftharpoons Pb^{2+} + H_3O^{+1}$
 - b. $Pb(OH)_2 \rightleftharpoons Pb^{2+} + 2OH^{-1}$**
 - c. $Pb(OH)_2 + H_3O^{+1} \rightleftharpoons Pb^{2+} + H_3O^{+1}$
 - d. $Pb(OH)_2 + H_2O \rightleftharpoons Pb^{2+} + 2OH_2$

2. (#8-2) A can of soda has a pH of 3.0. Which of the following is true?
- I. Quantity of H^+ ions > quantity of H_2O molecules **No**
 - II. $[H^+]$ ions > $[OH^{-1}]$ ions **Y**
 - III. $[H^+]$ ions = $1.0 \times 10^{-3} M$ **Y**
- $10^{-3.0} = 0.001$
- a. I only
 - b. I and II only
 - c. II and III only**
 - d. I, II, and III

3. (#8-3) Which of the following acids could neutralize the least amount of OH^{-1} ions?



4. (#8-4) Which of the following is true when comparing a 20.0mL of 0.1M HF solution vs a 10.0mL of 0.2M HCl
- I. They are the same pH. **No**
 - II. Both can neutralize the same quantity of base. **Y**
 - III. The K_a for HF is less than the K_a of HCl. **Y**
- a. I only
 - b. I and II only
 - c. II and III only**
 - d. I, II and III

5. (#8-4) Two acid samples (HA & HB) of equal concentrations and equal volumes.
 Acid HA: $K_a = 1.8 \times 10^{-4}$ Acid HB: $K_a = \text{Very large}$
- I. A 0.1M sample of HB has a pH of 1. **Yes**
 - II. Both acids are considered strong **No**
 - III. HB will be able to neutralize more base than HA. **No**

- a. I only**
- b. I and II only
- c. II and III only
- d. I, II, and III

Objectives: #8: 2-4

6. Vomit has a pH of 2.0 and soda had a pH of 3.5.
 (#8-2)

a. What is the concentration of H_3O^+ in vomit? $10^{-2.0} = 0.01 M$

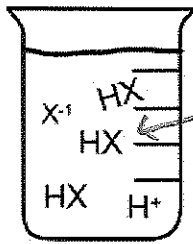
b. What is the pOH of soda?

$14 - 3.5 = 10.5$

c. Student hypothesis: If vomit and soda have the same concentration they will have the same pH. Justify or nullify. (#8-3)

No, they do not have the same K_a or strength

d. The model below is of a sample of soda. Is it a strong or weak? justify. (#8-3)



This is a Reactant Weak and Reactant favored.

7. (#8-3) Hydrofluoric acid is a notorious acid. It was highlighted in several movies (Saw VI and Breaking bad) for its notorious behavior.

Justify or nullify the following statements

a) HF is dangerous because it is a strong acid.

False, it is a weak acid, Reactant favored

b) The bond in H-F is stronger than the bond in H-Cl.

True, that bond is stronger, making acid weaker.

8. (#8-4)

Calculate the percent dissociation of Hydrofluoric acid ($K_a = 1.8 \times 10^{-5}$) in each of the following solutions.

All the following questions must be correct for this point? (#8-4)

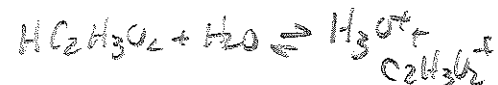
a) Write the hydrolysis reaction for HF



b) Write the equilibrium expression for this acid.

$$K_a = \frac{[H_3O^+][F^-]}{[HF]}$$

c) Write the hydrolysis expression for the conjugate of acetic acid?



d) Will the conjugate be acidic/neutral/basic? explain.

e) Write the equilibrium expression for the conjugate.



f) What is the K_b ?

$$K_a \cdot K_b = K_w$$

$$1.8 \times 10^{-5} / 1.8 \times 10^{-5} = 5.55 \times 10^{-10}$$

h) What is the pH of this solution 1.00 M HF (#8-4)

$$1.8 \times 10^{-5} = \frac{x \cdot x}{1M}$$

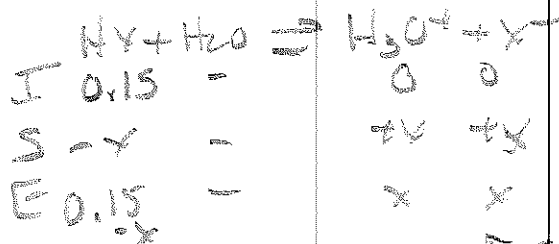
$$x = 0.00424 M$$

$$-\log(0.00424) = 2.37$$

9. Lactic acid in a muscle can cause a burning sensation. If a .15M solution of lactic acid is 2.0% ionized.

What is the K_a for lactic acid? (#8-4)

HX



$$\% \text{ ionized} = \frac{\text{change } (x)}{\text{original}}$$

$$.02 = \frac{x}{.15}$$

$$x = 0.003$$

$$K_a = \frac{(0.003)^2}{0.147} = 6.12 \times 10^{-7}$$