**Weak Acids and Bases**

 **Worksheet**

Organic Chemistry Tutor

1. What is the pH of a 0.75 M HC2H3O2 solution?

Ka = 1.8 x 10-5.

2. What is the pH of a 0.25 M NH3 solution?

Kb = 1.8 x 10-5.

3. What is the pH of a 0.40 M NH4Cl solution?

Kb of NH3 is 1.8 x 10-5.

4. What is the pH of a 1.5 M NaF solution?

Ka of HF is 7.2 x 10-4.

5. Calculate the percent ionization of a solution of 0.75 M HF. Ka = 7.2 x 10-4.

6. Calculate the percent dissociation of a 1.5 M NH3 solution. Kb = 1.8 x 10-5.

7. A 0.25M solution of a weak acid is 4.2% dissociated. What is the Ka of the acid?

8. An acid is 3.0% dissociated and the pH of the solution is 2.9. What is the initial concentration of the acid?

9. The percent dissociation of an acid is 30% and its equilibrium concentration is 0.45 M. What is the Ka of the weak acid?

10. The pH of a 0.5 M weak acid (HA) is 3.21. What is the Ka of the acid?

11. The pH of a 0.75 M weak base is 10.4. What is the Kb of the weak base?

12. The pH of a 0.45 M NaX salt solution is 9.26. What is the Ka of the weak acid HX?

13. Which of the following is the weakest acid?

A. HF (Ka = 7.2 x 10-4)

B. HC2H3O2 (Ka = 1.8 x 10-5)

C. HNO2 (Ka = 4.0 x 10-4)

D. HCN (Ka = 6.2 x 10-10)

E. HClO (Ka = 3.5 x 10-8)

14. A 0.0015 M aqueous solution of a certain compound has a pH of 2.82. Which of the following answer choices best describes this compound?

A. Strong Acid

B. Strong Base

C. Weak Acid

D. Weak Base

E. Neutral Salt

15. Which of the following substances when dissolved in water will produce a solution with the highest pH? (Feel free to consult a table of Ka values)

A. 0.1 M NaBr

B. 0.1 M NaF

C. 0.1 M FeCl3­

D. 0.1 M NH4NO3

E. 0.1 M NaCN

16. Describe each of the following compounds as acidic, basic, or neutral. Feel free to consult a table of Ka values.

I. NH4CN

II. NH4F

III. NH4C2H3O2

17. What is the pH of a solution containing 1.0 M HF and 1.0 M HCN? The values for HF and HCN are 7.2 x 10-4 and 6.2 x 10-10 respectively.

18. What is the pH of a solution containing 0.05 M HCl and 0.5 M HC2H3O2? The Ka value for HC2H3O2 is 1.8 x 10-5.

19. What mass of HCN should be dissolved in enough water to form a 300 mL solution with a pH of 5.254? (Ka = 6.2 x 10-10)

**Answers:**

1. pH = 2.43

2. pH = 11.3

3. pH = 4.83

4. pH = 8.66

5. 3.1%

6. 0.35%

7. Ka = 4.6 x 10-4

8. [HA]0 = 0.042 M

9. Ka = 8.27 x 10-2

10. Ka = 7.61 x 10-7

11. Kb = 8.4 x 10-8

12. Ka = 1.36 x 10-5

13. D

14. A

15. E

16. NH4CN = Basic, NH4F = Acidic, and NH4C2H3O2 = Neutral

17. pH = 1.58

18. pH = 1.3

19. 0.41g