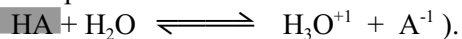


## Calculating the pH of Weak Acid Solutions

You are provided with a list of the name of the weak acid, the concentration, and the acid ionization constant,  $K_a$ ; that may be used to insert in the statement of the problem to solve.

To write an acid ionization equation for the acid, you may use the boldface first letters of the acid name to represent the acid and the anion formed by the ionization of the acid, ( for example:



Your task is to determine the pH of the acid. In order to achieve this, complete the following statement:

To determine the pH of a \_\_\_\_\_ mol dm<sup>-3</sup> solution of \_\_\_\_\_ acid, given,  $K_a =$

Weak Acid	$K_a$	concentration (mol dm <sup>-3</sup> )
Anisic	$3.38 \times 10^{-5}$	0.150
Cyanoacetic	$3.65 \times 10^{-5}$	0.220
Ethylbenzoic	$4.48 \times 10^{-6}$	0.324
Hexanoic	$1.31 \times 10^{-5}$	0.125
Methylmalonic	$1.71 \times 10^{-6}$	0.055
Trimethylacetic	$9.48 \times 10^{-6}$	0.336

1. Choose an acid from the above table, use the  $K_a$  of the acid given in the table above.
2. Rewrite the statement of the problem, fill in the blanks with the specified acid name, its concentration and its given  $K_a$ .
3. Solve the problem using the following technique:
  - a. Write the ionization equation for the acid dissolving in water. Use the boldfaced letters to represent the anion.
  - b. Write the  $K_a$  expression for the specific acid.
  - c. Calculate the pH of the acid solution, showing steps to justify your answer. Do not forget sig. figs. and correct units.

### For further practice:

Simply repeat step 1 (i.e. pick an acid and its  $K_a$ ), but now in step 2 use one of the different concentration given.

Now, repeat step 3.

By changing the concentration each time, you actually have a total of 36 weak acid problems to solve.