

## Answer on Question #58555 – Chemistry – Other

### Task:

The  $K_a$  for methanoic acid, the chemical that causes the sting in insect bites, is  $1.8 \times 10^{-4}$ . Calculate the pH of a 0.40 mol/L methanoic acid solution.

### Solution:

The equation of the dissociation of methanoic acid:



The molar concentration of methanoic acid:

$$C = 0.40 \text{ mol / l}$$

Find the equilibrium concentration of hydrogen ions by the formula:

$$[H^+] = \sqrt{K_a \times C}$$

Where:

$K_a$  - dissociation constant;

C - the molar concentration.

We get:

$$[H^+] = \sqrt{1.8 \times 10^{-4} \times 0.4} = \sqrt{7.2 \times 10^{-5}} = 0.00848.$$

We compute pH by the formula:

$$pH = -\lg[H^+].$$

pH value (pH) of the solution is numerically equal to the negative decimal logarithm of the hydrogen ion concentration in the solution.

We get:

$$pH = -\lg[0.00848] = 2.07$$

**Answer:**  $pH = 2.07$  .