

## Answer on the question #61140, Chemistry / Other

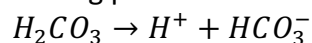
### Question:

Calculate the pH for the following solutions of weak acids and bases, make sure you know if you are dealing with an acid or a base.

0.051 M  $H_2CO_3$  ( $K_a = 4.5 \cdot 10^{-7}$ ) pH

### Solution:

$H_2CO_3$  is an acid, it dissociates, producing proton:



The equilibrium constant of this reaction is:

$$K_a = \frac{[H^+][HCO_3^-]}{[H_2CO_3]}$$

where the values in square brackets are concentrations of particles. As  $[H^+]$  is equal to  $[HCO_3^-]$ , we can write:

$$[H^+]^2 = K_a \cdot [H_2CO_3] = 4.5 \cdot 10^{-7} \cdot 0.051 = 0.23 \cdot 10^{-7}$$

Then, pH of the solution is:

$$pH = -\log([H^+]) = -0.5 \cdot \log(0.23 \cdot 10^{-7}) = 3.82$$

**Answer:** pH of the solution is 3.82