Answer on the Question #68539, Chemistry / Other

What is the pH of a solution containing 0.35 M phenol (Ka = 1.3 x 10-10) and 0.40 M sodium phenoate?

Solution:

pH is the negative logarithm of equilibrium concentration of Hydrogen ions [H^+]:

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

To calculate equilibrium concentration of [H^+] using following equation:

$$[H^+] = K_a \frac{C(C_6H_5OH)}{C(C_6H_5ONa)} = 1.3 \cdot 10^{-10} \frac{0.35M}{0.40M} = 1.1 \cdot 10^{-10}$$

After we can calculate pH of buffer solution:

$$pH = -\lg[H^+] = -\lg(1.1 \cdot 10^{-10}) = 9.96$$

Answer: pH of solution is 9.96