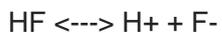


Question #61566 – Chemistry – Organic Chemistry

2. What would be the equilibrium pH if 200 milligrams of Hydrofluoric acid (HF) were dissolved in 1 liter of solution? The pKa for the acid is equal to 3.2. (Hint: Convert pKa to Ka)

Solution:



$$[\text{H}^+] = [\text{F}^-] + [\text{OH}^-]$$

$$C_{\text{HF}} = [\text{HF}] + [\text{F}^-]$$

$$K_a = \frac{[\text{H}^+][\text{F}^-]}{[\text{HF}]}$$

$$[\text{H}^+] = \frac{K_a C_{\text{HF}}}{(\text{H}^+ + K_a) + K_w / [\text{H}^+]}$$

$$C_{\text{HF}} = 0.2 / (20 \times 1) = 0.01 \text{ mol/l}$$

$$K_a = 10^{-3.2} = 6.3 \times 10^{-4}$$

$$[\text{H}^+] = 0.00222 \text{ mol/l}$$

$$\text{pH} = 2.65$$

Answer: pH=2.65