Dear expert, please provide an answer to the question below within 12 hours.

An acid has an acid dissociation constant of 2.8 x 10–9. What is the base dissociation constant of its conjugate base?

Answer:

$HA = H^+ + A^-$

$K_D = [H^+] \times [A^-] / [HA]$

$[H^+] = [A^-]$ $[H^+] \times [A^-] = [A^-]^2$

$K_D = [A^-]^2 / [HA]$

$[A^-]^2 = K_D \times [HA]$

$[A^-] = \sqrt{KD\ x\ [HA]} = \sqrt{2.8x10-9x1} = 5.29 \times 10^{-5}$ M

$pH = - lg[H^+] = 4.28$

$pH + pOH = 14$

$pOH = 14 – pH = 14 – 4.28 = 9.72$

$[OH] = ant\ lg\ pOH = ant\ lg\ 9.72 = 1.905 \times 10^{-10}$