The pH of 0.200 M NaA (the sodium salt of a weak acid HA) is 8.24.
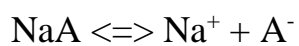
Calculate the pKa of the weak acid HA.

pH = 8.24

C(NaA) = 0.200 M

$pK_w = 14$

pKa - ?

$NaA \Longleftrightarrow Na^+ + A^-$

$pH = \frac{1}{2}(pK_a + pK_w + lgC)$

$8.24 = \frac{1}{2}(pK_a + 14 - 0.69)$

$16.48 = pK_a + 14 - 0.69$

$pK_a = 3.17$

This weak acid is HF.