

- Ascorbic acid (Vitamin C) is a monoprotic acid of formula $C_6H_8O_6$. Calculate the pH of a 0.10 M solution of ascorbic acid, given the K_a of ascorbic acid is 8.0×10^{-5} M.

As ascorbic acid is a weak acid, $[H_3O^+]$ must be calculated:

	$C_6H_8O_6$	H_2O	\rightleftharpoons	H_3O^+	$C_6H_7O_6^-$
initial	0.1	large		0	0
change	-x	negligible		+x	+x
final	0.10 - x	large		x	x

The equilibrium constant K_a is given by:

$$K_a = \frac{[H_3O^+(aq)][C_6H_7O_6^-(aq)]}{[C_6H_8O_6(aq)]} = \frac{x^2}{(0.10-x)}$$

As $K_a = 8.0 \times 10^{-5}$ is very small, $0.10 - x \sim 0.10$ and hence:

$$x^2 = 0.1 \times (8.0 \times 10^{-5}) \text{ or } x = 2.8 \times 10^{-3} \text{ M} = [H_3O^+(aq)]$$

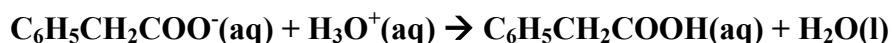
Hence, the pH is given by:

$$\text{pH} = -\log_{10}[H_3O^+(aq)] = -\log_{10}[0.0028] = 2.5$$

Answer: pH = 2.5

- Write equations to show what happens to a buffer solution containing equimolar amounts of $C_6H_5CH_2COOH$ and $C_6H_5CH_2COOK$ when:
 - H_3O^+ is added,
 - OH^- is added.

(a)



(b)

