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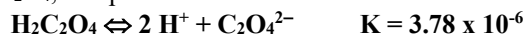
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Show all work for each problem. Box your final answers.

The overall dissociation of oxalic acid, $\text{H}_2\text{C}_2\text{O}_4$, is represented below. The overall dissociation constant is also indicated.



[1] What volume of 0.400-molar NaOH is required to neutralize completely a 5.00×10^{-3} mole sample of pure oxalic acid? **25.0 mL**

[2] Give the equations representing the first and second dissociations of oxalic acid.

[2a] Calculate the value of the first dissociation constant, K_1 , for oxalic acid if the value of the second dissociation constant, K_2 , is 6.40×10^{-5} . **5.91×10^{-2}**

[3] To a 0.015-molar solution of oxalic acid, a strong acid is added until the pH is 0.5. Calculate the $[\text{C}_2\text{O}_4^{2-}]$ in the resulting solution. (Assume the change in volume is negligible.) **$5.67 \times 10^{-7} \text{ M}$**

[4] Calculate the value of the equilibrium constant, K_b , for the reaction that occurs when solid $\text{Na}_2\text{C}_2\text{O}_4$ is dissolved in water. **1.56×10^{-1}**