Question 21 (3 marks)

A 0.001 mol L\(^{-1}\) solution of hydrochloric acid and a 0.056 mol L\(^{-1}\) solution of ethanoic acid both have a pH of 3.0.

Why do both solutions have the same pH?

Although HCl is a stronger acid than ethanoic acid, and has a higher rate of dissociation, the ethanoic acid solution has a much higher concentration, meaning there are more H\(^+\) ions in solution, giving it a similar pH to the HCl acid, despite its lower dissociation rate.