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. **3**

Why do both solutions have the same pH?

pH is a measure of the amount of free H^+ ions. In HCl, although there is a lower concentration of H^+ ions, these ions completely ionise. Hence HCl is a strong acid. On the other hand, whilst concentration of ethanoic acid is much higher (and hence concentration of H^+), these protons do not ionise completely. As only ~2% ionisation, ethanoic is a very weak acid. Hence, both solution have same pH despite varying concentrations due to the ~~[illegible]~~ ionising a difference in ionisation of H^+.