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?

Hydrochloric acid is a strong acid. with a degree of ionisation close to a hundred percent. While ethanoic acid is a weak acid. Hence even though ethanoic acid has a greater concentration, at this point, it has the same number of protons, or hydrogen ions, as Hydrochloric acid, as the stronger an acid, the more protons it has to ionise and since $pH = -\log_{10}[H^+]$ is concentration of H^+ is the same the pH is the same.