

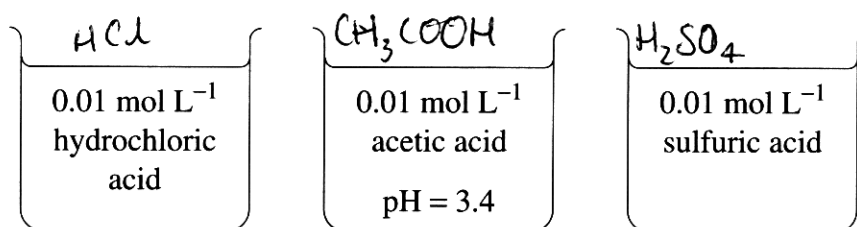
Chemistry

Section I – Part B (continued)

Marks

Question 22 (5 marks)

Solutions of hydrochloric acid, acetic acid and sulfuric acid were prepared. Each of the solutions had the same concentration (0.01 mol L^{-1}). The pH of the acetic acid solution was 3.4.



- (a) Calculate the pH of the hydrochloric acid solution. 1

$\text{pH of HCl} = \text{B/A} \quad \text{pH of HCl} = 2$

- (b) Compare the pH of the sulfuric acid solution to the pH of the hydrochloric acid solution. Justify your answer. (No calculations are necessary.) 2

The pH of sulfuric acid is ~~3.4~~ ~~4~~ which is the same as the pH of the hydrochloric acid. The solutions had the same concentration of H^+ ions and therefore the pH was the same. The concentration of 0.01 mol L^{-1} in both HCl and H_2SO_4 provides a pH of 2 for both acids.

- (c) Explain why the acetic acid solution has a higher pH than the hydrochloric acid solution. 2

The acetic acid solution has a higher concentration of OH^- ions. The hydroxide in acetic acid increases the pH and the solution is therefore more basic than the HCl. The pH of 2 for HCl is due to H^+ ion concentration as no OH^- is present the solution has a lower pH \therefore more acidic.