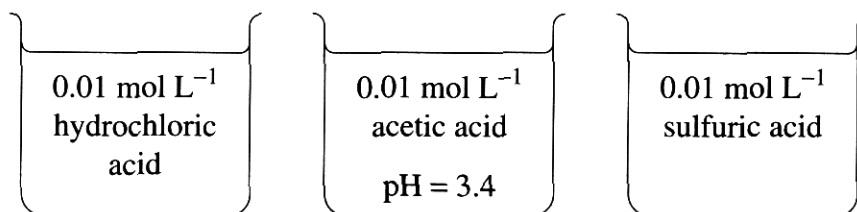Section I – Part B (continued)

___

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.

0.01 mol L^{-1} hydrochloric acid	0.01 mol L^{-1} acetic acid pH = 3.4	0.01 mol L^{-1} sulfuric acid

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

$$pH = -\log_{10}[0.01] = 2$$

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

· The pH of a H_2SO_4 is the same as HCl as both acids are strong acids. & have the same concentration, 0.01 mo/L.

· ∴ 100% ionisation occurs in both the HCl & H_2SO_4 solutions

· ∴ the pH of H_2SO_4 is 2 for 0.0mol/L

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

· Acetic Acid is not a strong acid

· ∴ Complete ionisation of does not occur in solution

· The degree of ionisation of is less than that of HCl ∴ acetic acid has a higher pH