2002 HIGHER SCHOOL CERTIFICATE EXAMINATION

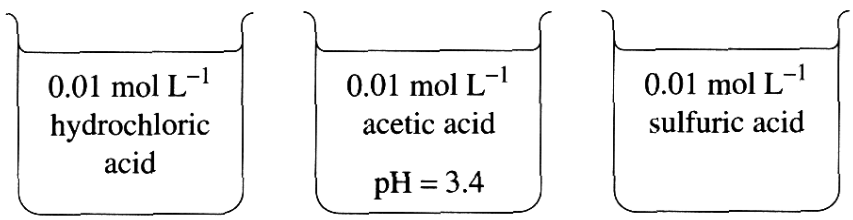
Chemistry

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**

pH 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 the sulfuric acid solution would be expected to be lower than that of the HCl because sulfuric acid ionises more completely in solution, thus making it a stronger acid, or more acid i.e. lower pH

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

Because HCl ionises more completely in solution than acetic acid. The higher the ionisation of an acid the stronger that acid is. i.e. HCl ionises more than acetic acid so HCl's pH will be lower than acetic acids.

Acetic acid has a lower pH than HCl because it does not ionise as completely as HCl