

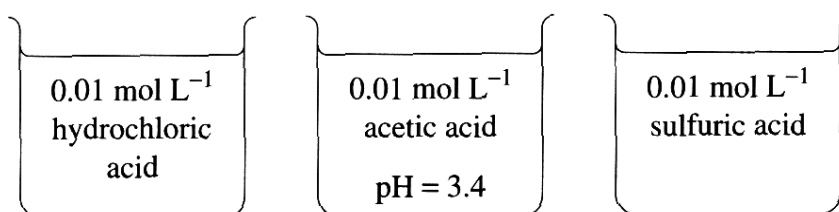
Chemistry

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

$pH = 2.0$

- (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

Since hydrochloric acid and sulfuric acid are both strong acids, their pH would be similar. However since sulfuric acid is a diprotic acid (releases two hydrogen ions per atom) the pH of sulfuric acid would be lower than the pH of hydrochloric acid (which is a monoprotic acid).

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

2

Acetic acid is a weak acid, that is it does not ionise completely. And since stronger acids have lower pH, hydrochloric (being a strong acid) ^(strong acids ionise completely) has a lower pH than acetic acid. Strong acids have lower pH than weak acids.