2001 HIGHER SCHOOL CERTIFICATE EXAMINATION

Chemistry

Section I – Part B (continued)

Marks

Question 19 (7 marks)

Name ONE type of cell, other than the dry cell or lead–acid cell, you have studied. Evaluate it in comparison with either the dry cell or lead–acid cell, in terms of chemistry and the impact on society. Include relevant chemical equations in your answer. **7**

The Mercury cell compared with the dry cell. The mercury cell is used for things like hearing aids. They are more for thing that are continually, often used where as the dry cell is not often used and is fond in things like torches. The mercury cell supplies a ~~short~~ continuous low voltage supply of electricity whereas the dry cell supplies a higher voltage for a more limited period of time. The dry cell is more commonly used than the mercury cell as it has a world wide market.

Marks

Question 20 (4 marks)

A 0.1 mol L^{-1} solution of hydrochloric acid has a pH of 1.0, whereas a 0.1 mol L^{-1} solution of citric acid has a pH of 1.6.

(a) State ONE way in which pH can be measured. **1**

using a pH meter

(b) Explain why the two solutions have different pH values. **3**

citric acid is a weak acid, meaning it is not completely ionised and thus not as able to react, whilst HCl is a strong acid completely ionised, meaning there are complete ionisation to react and make it a much stronger acid with a higher concentration.

Marks

Question 21 (4 marks)

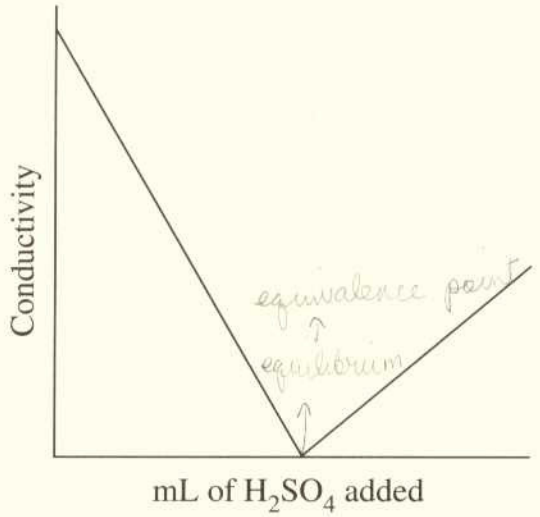
Barium hydroxide and sulfuric acid react according to the following equation:

$$Ba(OH)_2(aq) + H_2SO_4(aq) \rightarrow BaSO_4(s) + 2H_2O(l)$$

(a) Name this type of chemical reaction. **1**

neutralisation reaction

(b) A 20 mL sample of barium hydroxide was titrated with 0.12 mol L^{-1} sulfuric acid. The conductivity of the solution was measured throughout the titration and the results graphed, as shown. **3**



Explain the changes in conductivity shown by the graph.

During the titration Barium Hydroxide by itself was very conductive as ions were present and when H_2SO_4 was added a reaction occurs whereby the ionisation process is occurring, decreasing the solution's conductivity. Zero conductivity is achieved when the equivalence point is achieved. An excess of H_2SO_4 meant an excess in ions.