1. A student carries out an electrolysis experiment using the apparatus shown.

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The student uses dilute aqueous sodium chloride.

(a) State the name given to any solution which undergoes electrolysis.

…………………...................................................................................................................................[1]

(b) Hydroxide ions are discharged at the anode.

(i) Complete the ionic half-equation for this reaction.

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(ii) Explain how the ionic half-equation shows the hydroxide ions are being oxidised.

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(c) Describe what the student observes at the cathode.

………………….................................................................................................................................. [1]

(d) Write the ionic half-equation for the reaction at the cathode.

…………………...................................................................................................................................[1]

(e) The student repeats the experiment using concentrated aqueous sodium chloride.

(i) Describe what the student observes at:

● the cathode ...................................................................................................................

● the anode. ................................................................................................................. [2]

(ii) The student added litmus to the solution after the electrolysis of concentrated aqueous

sodium chloride.

State the colour seen in the solution. Give a reason for your answer.

colour of solution .................................................................................................................

reason................................................................................................................................ [1]

(f) Carbon electrodes are used because they are inert.

State another element that can be used instead of carbon.

……………………...............................................................................................................................[1]

1. In the industrial electrolysis of concentrated sodium chloride solution, it is necessary to keep the chlorine gas and sodium hydroxide separated. Why? …………………………………………………………………………………………………………………………………………………………………………………………………………………….. ……………..[2]
2. In the electrolysis of concentrated aqueous sodium bromide hydrogen is one of the product.
3. Write an equation for the electrode reaction which forms hydrogen.

…………………………………………………………………………………………………… [2]

(b) Name the other two products of the electrolysis of concentrated aqueous sodium

bromide

(i)……………………………………………………………………………………………………[2]

(ii)……………………………………………………………………………………...………… [2]

(b) In the electrolysis of ionic salt, explain why the substance has to be molten or aqueous for electrolysis to happen.

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