**Electrolysis test HT – Mark Scheme**

**M1.**(a)     bromine

**1**

ions

**1**

atoms

**1**

(b)     correct scale on y axis

**1**

points correctly plotted using the scale

*± ½ small square*

**1**

best-fit line drawn

**1**

(c)     value for oxygen divided by corresponding time

**1**

× 60

**1**

= 0.05 (cm3 / s)

*allow 0.05 with no working shown for* ***3*** *marks*

**1**

**[9]**

**M2.**(a)     (i)      because they are positively charged

*accept they are positive / H+*

*accept oppositely charged* ***or*** *opposites attract*

ignore they are attracted

**1**

(ii)     gains one / an electron

*accept H+  + e– → H or multiples*

*allow gains electrons*

**1**

 (b)     (i)      hydroxide / OH–

*do* ***not*** *accept sodium hydroxide*

**1**

(ii)     H+ + OH– → H2O

*ignore state symbols*

*ignore word equation*

**1**

(d)     Marks awarded for this answer will be determined by the Quality of
Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the Reference material.

**0 marks**No relevant content.

**Level 1 (1-2 marks)**There are basic descriptions of advantages or disadvantages of the electrolysis cells.

**Level 2 (3-4 marks)**There are clear descriptions of environmental or economic advantages or disadvantages of the electrolysis cells. Comparisons may be implied.

**Level 3 (5-6 marks)**There are detailed descriptions of environmental and economic advantages and disadvantages, comparing the electrolysis cells.

**Examples of chemistry points made in the response:**

Accept converse where appropriate.

•        mercury cell is more expensive to construct

•         mercury is recycled but membranes must be replaced

•         mercury is toxic but membrane / polymer is not

•         removing traces of mercury from waste is expensive

•         mercury cell uses more electricity

•         mercury cell produces chlorine that is purer

•         mercury cell produces higher concentration / better quality of sodium hydroxide (solution)

**6**

**[12]**

**M3.**          (a)     52.9(411765) / 53

*correct answer with or without working =* ***2*** *marks*

*if answer incorrect allow 2 x 27= 54* ***or*** *27/102 x 100* ***or*** *26.5 for* ***1*** *mark*

**2**

(b)     (i)     because it lowers the melting point (of the aluminium oxide)

*allow lowers the temperature needed*

*do* ***not*** *accept lowers boiling point*

**1**

so less energy is needed (to melt it)

*accept so that the cell / equipment does not melt*

**1**

(ii)      **2** O2–   on left hand side

*accept correct multiples or fractions*

**1**

**4e–**         on right hand side

*accept****–4e–****on left hand side*

**1**

(iii)     because the electrode reacts with oxygen **or**

because the electrode burns

**1**

to form carbon dioxide **or**

electrode made from carbon / graphite

**1**

**4. D**

**5. D**

**6. C**