2.5 Redox and Electrochemistry: 10-minute Pack

AQA 7405 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 When chlorine gas is bubbled into cold, dilute sodium hydroxide solution, a disproportionation reaction occurs.

(a) State the oxidation state of chlorine in Cl_2, and the oxidation states of chlorine in the two chlorine-containing products of this reaction, Cl^- and ClO^-. **(2)**

(b) Write ionic half-equations for the reduction and the oxidation processes that occur when chlorine reacts with cold, dilute hydroxide ions, OH^-. **(2)**

(c) Combine your two half-equations from part (b) to give the overall ionic equation for the reaction of chlorine with cold, dilute sodium hydroxide solution. **(2)**

(d) State the term used to describe a reaction, such as this one, in which the same element is simultaneously oxidised and reduced. **(1)**

(Total for Question 1 is 7 marks)

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Mark scheme · 2.5 Redox and Electrochemistry: 10-minute Pack

Question 1

(a) Cl in Cl_2 = 0 **B1**

(a) Cl in Cl^- = -1 and Cl in ClO^- = +1 (both required) **B1**

(a) Answer: Cl_2: 0; Cl^-: -1; ClO^-: +1

(b) reduction: $Cl_2 + 2e^- \rightarrow 2Cl^-$ (oe multiples) **B1**

(b) oxidation: $Cl_2 + 4OH^- \rightarrow 2ClO^- + 2H_2O + 2e^-$ (oe multiples) **B1**

(b) Answer: Reduction: $Cl_2 + 2e^- \rightarrow 2Cl^-$; Oxidation: $Cl_2 + 4OH^- \rightarrow 2ClO^- + 2H_2O + 2e^-$

(c) both half-equations added and divided by 2 so that 2e- cancel **M1**

(c) $Cl_2 + 2OH^- \rightarrow Cl^- + ClO^- + H_2O$ cao (accept whole-number multiples) **A1**

(c) Answer: $Cl_2 + 2OH^- \rightarrow Cl^- + ClO^- + H_2O$

(d) disproportionation cao **B1**

(d) Answer: Disproportionation

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