

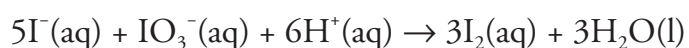
Test yourself

Chapter 7

1 In which of the following compounds is sulfur in its highest oxidation state?



2 Iodide ions react with iodate(V) ions in acidic solution:



Which one of the following statements about this reaction is correct?

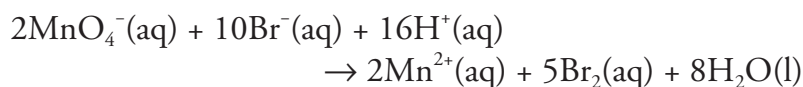
A The I^- ions act as an oxidising agent

B The iodine in the IO_3^- ions changes in oxidation number from -5 to 0

C The IO_3^- ions act as an oxidising agent

D The oxidation number of the hydrogen changes from 0 to $+1$

- 3** Manganate(VII) ions react with bromide ions in acidic solution:



Which one of the following half-equations relating to this reaction is correct?

- A** $2\text{MnO}_4^-(\text{aq}) + 8\text{H}^+(\text{aq}) \rightarrow 2\text{Mn}^{2+}(\text{aq}) + 4\text{H}_2\text{O}(\text{l}) + 5\text{e}^-$
- B** $\text{MnO}_4^-(\text{aq}) + 8\text{H}^+(\text{aq}) + 5\text{e}^- \rightarrow \text{Mn}^{2+}(\text{aq}) + 4\text{H}_2\text{O}(\text{l})$
- C** $5\text{Br}^-(\text{aq}) \rightarrow 5\text{Br}_2(\text{aq}) + 5\text{e}^-$
- D** $2\text{MnO}_4^-(\text{aq}) + 8\text{H}^+(\text{aq}) + 2\text{e}^- \rightarrow 2\text{Mn}^{2+}(\text{aq}) + 4\text{H}_2\text{O}(\text{l})$
- 4** When a car battery is charged, the following reaction occurs:

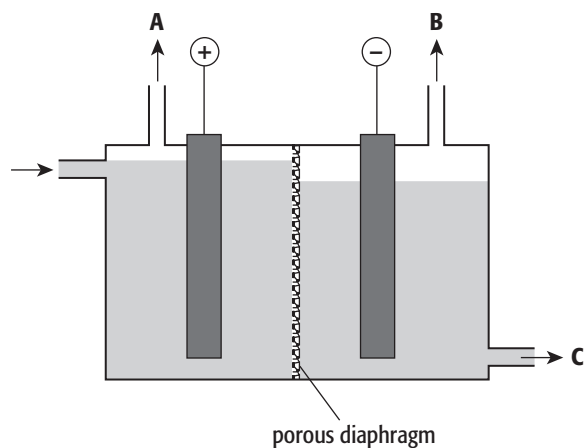


Which one of the following statements about this reaction is correct?

- A** Water is acting as an oxidising agent
- B** The oxidation number of each oxygen atom changes from -2 to -1
- C** The hydrogen atoms in the water lose electrons to become H^+ ions
- D** Pb^{2+} ions are both oxidised and reduced during the reaction

- 5 Which one of the following is named **incorrectly**?
- A Cl_2O_7 , chlorine(VII) oxide
 - B CuCl , copper(I) chloride
 - C VO^{2+} , vanadate(IV) ion
 - D MnO_4^{2-} , manganate(VII) ion
- 6 Which one of the following statements about the redox reactions taking place during the electrolysis of molten sodium chloride is correct?
- A When the cations reach the cathode they gain electrons
 - B Anions are reduced at the anode
 - C Cations are oxidised at the cathode
 - D When anions reach the anode they gain electrons
- 7 Which one of the following statements about the extraction of aluminium by electrolysis is correct?
- A At the cathode, oxide ions are reduced to oxygen
 - B Aluminium metal is removed from the surface of the electrolyte
 - C Aluminium ions gain electrons at the cathode
 - D The electrolyte is pure molten aluminium oxide

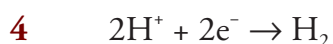
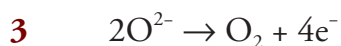
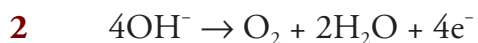
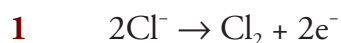
- 8 The diagram shows a diaphragm cell used to electrolyse concentrated brine. The letters **A**, **B** and **C** show the places where the products of electrolysis are removed.



Which one of the following statements about the products of this electrolysis is completely correct?

- A** Oxygen is removed at **A**, hydrogen is removed at **B** and sodium hydroxide is removed at **C**
- B** Hydrogen is removed at **A**, chlorine is removed at **B** and sodium hydroxide is removed at **C**
- C** Chlorine is removed at **A**, hydrogen is removed at **B** and sodium is removed at **C**
- D** Chlorine is removed at **A**, hydrogen is removed at **B** and sodium hydroxide is removed at **C**

9 Four half-reactions (1–4) are shown below.



Which **two** of these reactions are most likely to occur when concentrated brine is electrolysed?

A 1 and 2

B 1 and 4

C 2 and 3

D 2 and 4

10 Copper is purified by electrolysis of copper(II) sulfate solution using copper electrodes. Which one of these statements about this electrolysis is correct?

A At the anode, Cu^{2+} ions lose electrons

B At the cathode, Cu atoms lose electrons

C At the anode, Cu atoms lose electrons

D At the anode Cu^{2+} ions gain electrons