Exam Papers Practice

9.1 Redox Processes

Question Paper

Course	DP IB Chemistry
Section	9. Redox Processes
Topic	9.1 Redox Processes
Difficulty	Medium

Exam Papers Practice

To be used by all students preparing for DP IB Chemistry SL
Students of other boards may also find this useful

Question 1

Oxidation numbers can be used to balance equations. Chlorine and hot aqueous sodium hydroxide react to produce chloride ions, chlorate ions and water.

What are the values of the coefficients **p**, **r** and **s** in the equation?

$$\mathbf{p}Cl_2(g) + \mathbf{q}OH^-(aq) \rightarrow \mathbf{r}Cl^-(aq) + \mathbf{s}ClO_3^-(aq) + \mathbf{t}H_2O(l)$$

	p	r	s
A	3	5	1
B	3	6	2
C	2	5	1
D	2	4	2

[1 mark]

Question 2

The chemistry of the Group VII elements often involves redox processes.

Which of the following statements is correct?

A. Bromine can oxidise chloride ions

B. Iodide ions are the weakest reducing agent of the first four Group VII ions

C. In reactions with water, chlorine is oxidised and reduced

D. Fluorine is a weaker oxidising agent than chlorine

[1 mark]

Question 3

Four reactions are shown below. In which reaction is the species shown in bold acting as an oxidising agent?

A. $Cr_2O_7^{2-} + 8H^+ + \mathbf{3SO_3^{2-}} \rightarrow 2Cr^{3+} + 4H_2O + 3SO_4^{2-}$

B. $Mg + \mathbf{Fe^{2+}} \rightarrow Mg^{2+} + Fe$

C. $Cl_2 + \mathbf{2Br^-} \rightarrow 2Cl^- + Br_2$

D. $Fe_2O_3 + \mathbf{3CO} \rightarrow 2Fe + 3CO_2$

[1 mark]

Question 4

In which compound are there two different elements with the same oxidation number?

A. $Mg(OH)_2$

B. Na_2SO_4

C. HClO

D. NH_4Cl

[1 mark]

Question 5

When sulfuric acid and sodium iodide react, one of the reactions that takes place is shown by the equation below:

$$8NaI + 9H_2SO_4 \rightarrow 8NaHSO_4 + 4I_2 + H_2S + 4H_2O$$

Which species has been oxidised in this reaction?

A. I^-

B. SO_4^{2-}

C. Na^+

D. H^+

[1 mark]

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Question 6

The following reaction can be used to determine the mass of titanium dioxide in an ore.

$$3TiO_2 + 4BrF_3 \rightarrow 3TiF_4 + 2Br_2 + 3O_2$$

Which element increases in oxidation number in this reaction?

A. fluorine

B. bromine

C. titanium

D. oxygen

[1 mark]

Question 7

In which reaction does hydrogen behave as an oxidizing agent?

A. $2Na + H_2 \rightarrow 2NaH$

B. $N_2 + 3H_2 \rightarrow 2NH_3$

C. $H_2 + Cl_2 \rightarrow 2HCl$

D. $C_2H_4 + H_2 \rightarrow C_2H_6$

[1 mark]

Question 8

When solid potassium halides are added to concentrated sulfuric acid, the following reactions take place:

reaction 1 $2KBr + 2H_2SO_4 \rightarrow K_2SO_4 + SO_2 + Br_2 + 2H_2O$

reaction 2 $8KI + 5H_2SO_4 \rightarrow 4K_2SO_4 + H_2S + 4I_2 + 4H_2O$

reaction 3 $2KCl + H_2SO_4 \rightarrow K_2SO_4 + 2HCl$

In each reaction, what is the largest change in the oxidation number of sulfur?

	Reaction 1	Reaction 2	Reaction 3
A	1	4	1
B	2	4	0
C	2	8	0
D	4	8	1

[1 mark]

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Question 9

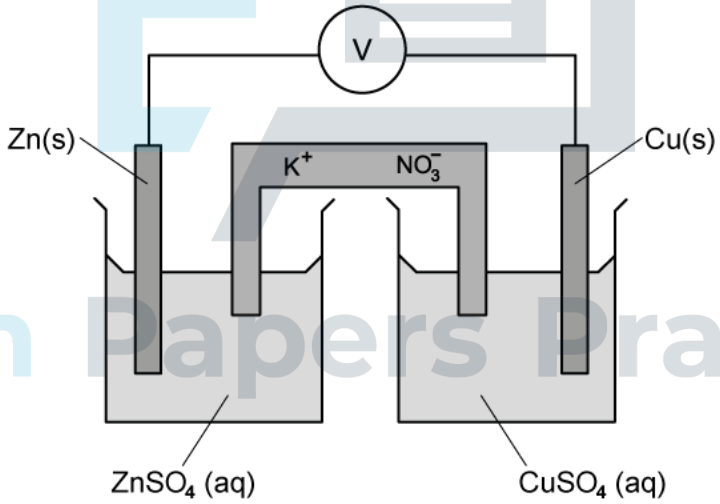
What is formed at the electrodes during the electrolysis of molten potassium iodide?

	Positive electrode	Negative electrode
A	K^+	I^-
B	K	I_2
C	I^-	K^+
D	I_2	K

[1 mark]

Question 10

Below is a diagram of a voltaic cell. When the cell is running, what is happening in the salt bridge?



A. K^+ ions flow to the zinc half-cell and NO_3^- ions flow to the copper half-cell

B. K^+ ions flow to the copper half-cell and NO_3^- ions flow to the zinc half-cell

C. K^+ and NO_3^- ions flow to the copper half-cell

D. K^+ and NO_3^- ions flow to the zinc half-cell

[1 mark]