



EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

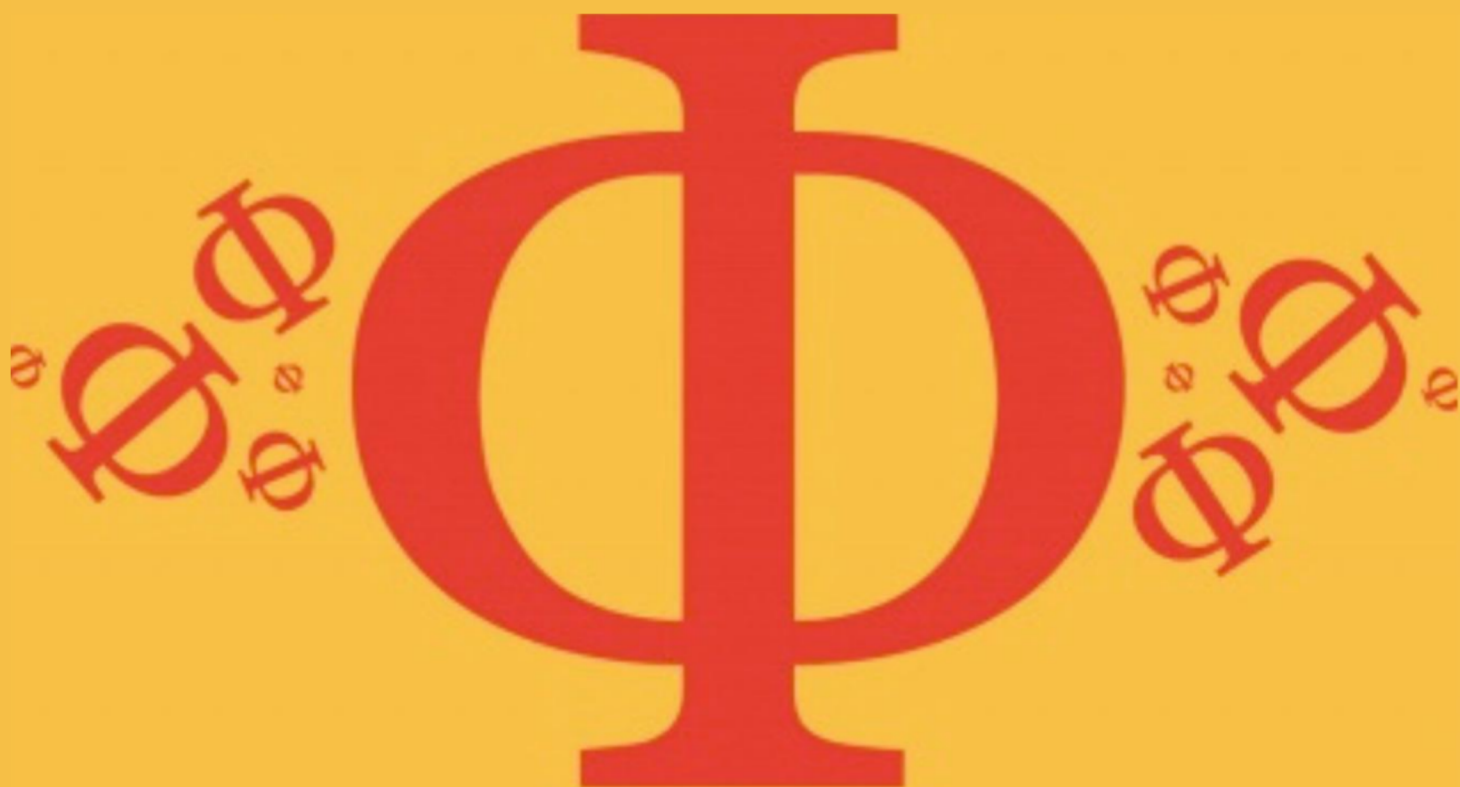
Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

IB Chemistry: SL

9.1 Redox Processes



CHEMISTRY

SL

9.1 Redox Processes

Question Paper

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

EXAM PAPERS PRACTICE

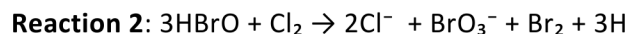
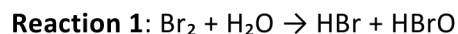
Time allowed: 20

Score: /10

Percentage: /100

Question 1

If a solution contains both bromine and chlorine, BrO_3^- ions are produced. The reactions leading to the production of BrO_3^- ions are shown below:



- 1 Chlorine is reduced in reaction 2
- 2 Bromine is reduced in both reaction 1 and reaction 2
- 3 Bromine is oxidised in both reaction 1 and reaction 2

Which statements about these reactions are correct?

- A. 1 only
- B. 1 and 2 only
- C. 2 and 3 only
- D. 1, 2 and 3

[1 mark]

Question 2

When heated ammonium nitrate, NH_4NO_3 , can decompose explosively.



The nitrogen atoms in NH_4NO_3 have different oxidation numbers.

What are the oxidation numbers for each of the N atoms when this reaction proceeds?

- A. +4, -4
- B. -2, -4
- C. +4, -6
- D. +2, +6

[1 mark]

Question 3

In winemaking, to prevent the oxidation of ethanol by air, sulfur dioxide (SO_2) is added. In order to calculate the amount of SO_2 a sample is titrated with iodine (I_2). The reaction is a one to one ratio for SO_2 and I to produce H_2SO_4 as well as another product.

- A. +2 to +6
- B. +4 to +6
- C. +2 to +4
- D. +4 to +5

[1 mark]

Question 4

20 cm^3 of a 0.60 mol^{-3} dm solution of thallium nitrate (TlNO_3) requires 40 cm^3 of 0.20 mol^{-3} dm acidified ammonium metavanadate (NH_4VO_3) to produce $\text{Tl}^{3+}_{(\text{aq})}$ ions.

Vanadium is the only element reduced in this reaction. What is the oxidation number of the reduced vanadium?

- A. +1
- B. +2
- C. +3
- D. +4

[1 mark]

Question 5

Below are four descriptions about the movements of electrons in voltaic cells.

Which is the correct statement?

- A. Electrons flow through the external wire from the cathode (positive electrode) to the anode (negative electrode)
- B. Electrons flow through the external wire from the anode (negative electrode) to the cathode (positive electrode)
- C. Electrons flow through the salt bridge from the oxidizing agent to the reducing agent
- D. Electrons flow through the salt bridge from the reducing agent to the oxidizing agent

[1 mark]

Question 6

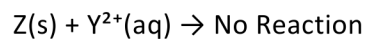
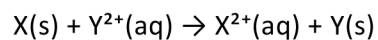
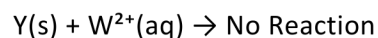
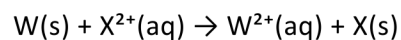
When molten magnesium chloride is electrolysed using graphite electrodes what are the products?

	Product at cathode (negative electrode)	Product at anode (positive electrode)
A	magnesium	chlorine
B	chlorine	magnesium
C	magnesium ions	chloride ions
D	chloride ions	magnesium ions

[1 mark]

Question 7

Use the information given about four reactions of metals to determine the order of reactivity from most reactive to least reactive



- A. $W > Y > X > Z$
- B. $X > W > Z > Y$
- C. $Z > Y > W > X$
- D. $W > X > Y > Z$

[1 mark]

Question 8

Below are three statements about voltaic cells.

- I. A redox reaction takes place which produces electrical energy
- II. At the cathode an oxidation reaction occurs
- III. Electrons move from the anode to the cathode

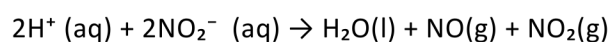
The correct statements are

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

[1 mark]

Question 9

If a dilute acid is added to an aqueous solution containing nitrite ions, NO_2^- , two different nitrogen compounds are released as gases.



Which of the three statements below correctly describe the process?

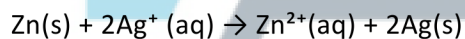
- 1 The H^+ (aq) ion is oxidised by NO_2^- (aq).
- 2 Some nitrogen atoms are oxidised, and some nitrogen atoms are reduced
- 3 The H^+ (aq) ion acts as a catalyst

- A. 1 and 2 only
 B. 2 only
 C. 2 and 3 only
 D. 1, 2 and 3

[1 mark]

Question 10

A voltaic cell consisting of zinc and silver is set up. The following overall reaction takes place:



What are the correct half-equations at each electrode?

	Anode (negative electrode)	Cathode (positive electrode)
A	$\text{Ag(s)} \rightarrow \text{Ag}^+(\text{aq}) + \text{e}^-$	$\text{Zn}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Zn(s)}$
B	$\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag(s)}$	$\text{Zn(s)} \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}^-$
C	$\text{Zn(s)} \rightarrow \text{Zn}^{2+}(\text{aq}) + 2\text{e}^-$	$\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag(s)}$
D	$\text{Zn}^{2+}(\text{aq}) + 2\text{e}^- \rightarrow \text{Zn(s)}$	$\text{Ag(s)} \rightarrow \text{Ag}^+(\text{aq}) + \text{e}^-$

[1 mark]