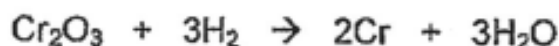


O Level Combined Chemistry Structured

Redox Test 1.0

Q1

- (b) In industry, chromite is changed into chromium(III) oxide, Cr_2O_3 . Metallic chromium is formed by heating this oxide in hydrogen gas. The balanced chemical equation for this reaction is



- (c) Reactions such as the one in (b) are known as redox reactions.

- (i) State the oxidation state of chromium in Cr_2O_3 .

..... [1]

- (ii) Which substance in the reaction above is reduced? Explain your answer.

.....
..... [2]

Q2

A disproportionation reaction is one where the same element is oxidised and reduced simultaneously.

Chlorine undergoes a disproportionation reaction as shown:

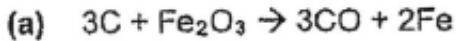


- (i) In terms of changes in oxidation state, explain why chlorine undergoes a disproportionation reaction.

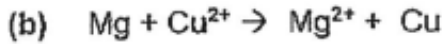
.....
.....[1]

Q3

In each of these redox equations, identify the oxidising agent and the reducing agent.



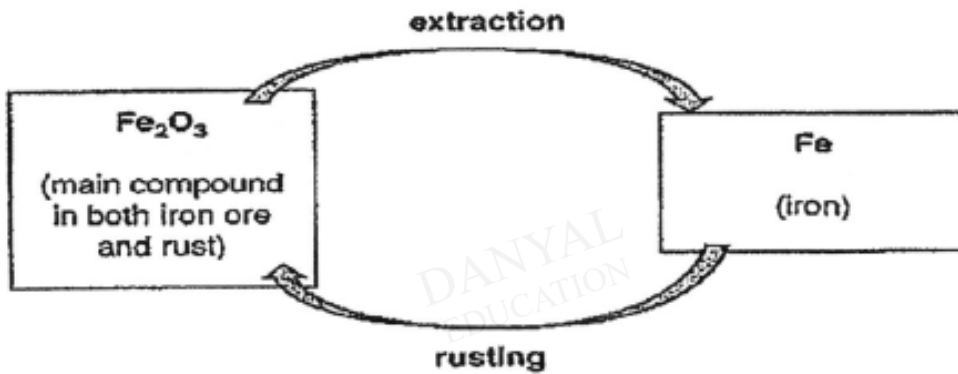
oxidising agent reducing agent [1]



oxidising agent reducing agent [1]

Q4

The diagram shows the cycle of changes that happen when iron is extracted and then rusts.



Identify the change that involves oxidation and the change that involves reduction. Give reasons for your answers.

.....
.....
.....

[2]

Q5

When chlorine gas is bubbled through a solution of sodium bromide, a chemical reaction occurs. The chemical equation of the reaction is stated below:



(a) Suggest the expected observation for this reaction.

.....[1]

(b) State the type of reaction that has occurred. Explain your answer.

.....[2]

(c) (i) Explain, with reasons, whether bromine in sodium bromide has been oxidised or reduced.

.....[2]

(ii) Identify the reducing agent.

.....[1]

(d) When sodium chloride is reacted with solution J, a white precipitate is formed. Suggest an identity for solution J.

.....[1]

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Answers

Redox Test 1.0

Q1

ci	Oxidation state of chromium = +3
ii	Chromium (III) oxide is reduced. Oxidation state of chromium decreases from +3 in Cr_2O_3 to 0 in Cr

Q2

Chlorine is oxidised as its oxidation state increases from 0 in Cl_2 to +5 in NaClO_3 .

Chlorine is reduced as its oxidation state decreases from 0 in Cl_2 to -1 in NaCl . [1]

Q3

(a) oxidizing agent: <u>Fe_2O_3</u> reducing agent: <u>C</u>	1m – all correct
(b) oxidizing agent: <u>Cu^{2+}</u> reducing agent: <u>Mg</u>	1m – all correct

Q4

Extraction is reduction as loss of oxygen atoms	1
Rusting is oxidation as gain of oxygen atoms	1
Deduct $\frac{1}{2}$ m if terms are not stated	

Q5

5(a)	Colourless solution turns <u>reddish-brown/brown</u>	[1]
(b)	<u>Displacement reaction.</u> Chlorine is <u>more reactive than bromine</u> , thus will <u>displace bromine</u>	[1] [1]
c)(i)	Bromine is <u>oxidised.</u> In the reaction, the oxidation state of bromine changes from <u>-1 in NaBr to 0 in Br_2.</u>	[1] [1]
(ii)	The reducing agent is <u>sodium bromide / NaBr</u>	[1]
(d)	Silver nitrate / lead(II) nitrate	[1]