

Name:	Target Grade:	Actual Grade:
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REDOX MCQ and STRUCTURED QUESTIONS

READ THESE INSTRUCTIONS FIRST

INSTRUCTIONS TO CANDIDATES

1. Find a quiet, comfortable spot free place from distractions.
2. Spend one minute on each mark.
3. Time yourself for every single question.
4. Every chapter has their own question types. Ensure that you know the different question type for each chapter.
5. Make a conscientious effort to remember your mistakes, especially in terms of answering techniques. E.g Take a picture for the mistakes that you made, keep it in a photo album, and revise it over and over again.
6. Highlight question types that you tend to keep making mistakes and review them nearing exams.
7. Always review the common questions and question type that you tend to make mistakes nearing exams.
8. During exams, classify the question type and recall what you have learnt, how you need to analyse the questions for the different question type, what you need to take note of and answer with the correct answering techniques!

✨ Wishing you all the best for this test!

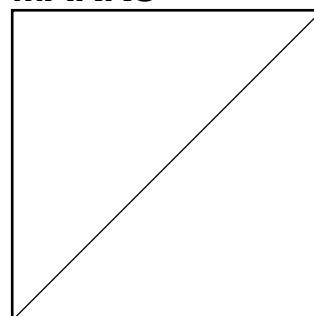
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If you are struggling in this paper, means you need to work harder!

If you need any professional guidance and further advice on how to advance, feel free to WhatsApp us at 91870820 or find us at www.bright-culture.com/. We are committed to connect you to your future to reach your goals.

MARKS



REDOX MCQ
Paper 1

1 In which of the reactions is the underlined substance acting as a reducing agent?

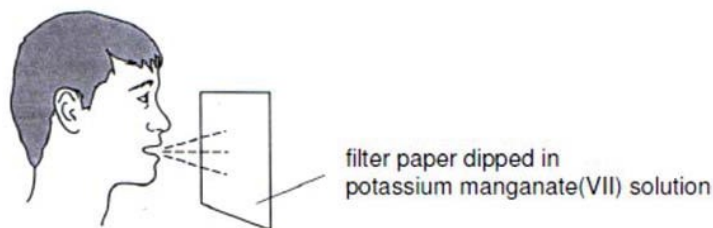
- A $\underline{\text{Cl}_2} + 2\text{FeCl}_2 \rightarrow 2\text{FeCl}_3$
- B $2\text{HCl} + \underline{\text{MgO}} \rightarrow \text{MgCl}_2 + \text{H}_2\text{O}$
- C $\text{H}_2 + \underline{\text{CuO}} \rightarrow \text{Cu} + \text{H}_2\text{O}$
- D $\text{ZnO} + \underline{\text{CO}} \rightarrow \text{Zn} + \text{CO}_2$

2 Disproportionation is a reaction in which the same element is both oxidised and reduced.

Which reaction is an example of disproportionation?

- A $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow \text{HClO} + \text{HCl}$
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A colour change of the filter paper is observed.

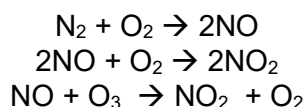
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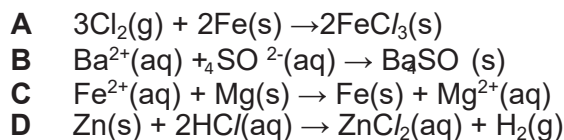
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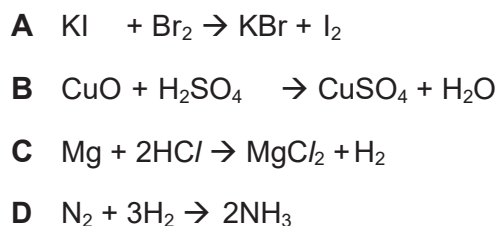
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What is the oxidation state of silicon in this compound?

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- 9 The presence of ethanol vapour in the breath of a person who has very recently consumed alcohol can be detected using a filter paper moistened with acidified potassium dichromate(VI).

If ethanol vapour is present, orange potassium dichromate(VI) spot will turn green. What does this suggest about the property of ethanol?

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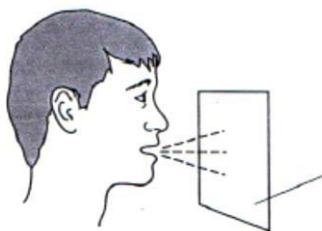
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Which statement is correct?

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- A K_2CrO_4 KMnO_4
- B CrCl_3 MnO_2
- C $\text{Cr}_2(\text{SO}_4)_3$ MnSO_4
- D $\text{K}_2\text{Cr}_2\text{O}_7$ MnO_4^-

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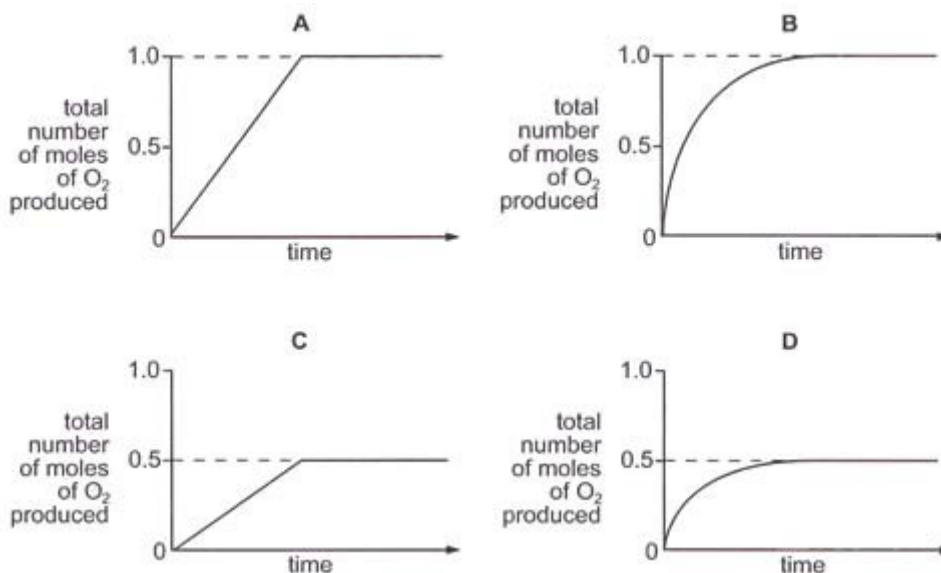


What is the oxidation number of platinum in each of these substances?

	cisplatin	aqua complex
A	+2	+1
B	+2	+2
C	+4	+3
D	+4	+4

- 15 Manganese(IV) oxide catalyses the decomposition of hydrogen peroxide (H_2O_2) into oxygen and water.

Which curve represents the decomposition of 1.0 mol of hydrogen peroxide?



- 16 In which reaction is the underlined substance behaving as an oxidising agent?

- A** $\underline{\text{BaCl}_2} + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
- B** $3\text{CuO} + 2\underline{\text{NH}_3} \rightarrow 3\text{Cu} + \text{N}_2 + 3\text{H}_2\text{O}$
- C** $2\underline{\text{FeCl}_2} + \text{Cl}_2 \rightarrow 2\text{FeCl}_3$
- D** $2\text{NaI} + \underline{\text{Br}_2} \rightarrow 2\text{NaBr} + \text{I}_2$

- 17 The oxide of titanium, TiO_2 , is used as a 'whitener' in toothpaste. It is obtained from the ore iron(II) titanate, FeTiO_3 . What is the change, if any, in the oxidation number of titanium in the reaction $\text{FeTiO}_3 \rightarrow \text{TiO}_2$?

- A It is oxidized from +3 to +4.
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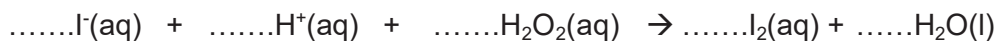
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-

REDOX STRUCTURED QUESTIONS

Paper 2 Section A

1 The reaction below is an example of a redox reaction.



(a) Balance the equation by inserting numbers (if necessary) on the dotted lines provided. [1]

(b) Identify the oxidising agent in this reaction. Explain your answer using oxidation states.

.....[2]

(c) What colour change will be seen when this reaction is carried out?

.....[1]

[Total: 4]

2 Name the following chemical processes.

	reaction	name of process
(i)	$\text{SiO}_2 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SiO}_3 + \text{H}_2\text{O}$	
(ii)	$\text{H}_2\text{SO}_4 + \text{CaCl}_2 \rightarrow 2\text{HCl} + \text{CaSO}_4$	
(iii)	$\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$	
(iv)	$\text{MgBr}_2 + \text{F}_2 \rightarrow \text{MgF}_2 + \text{Br}_2$	
(v)	$\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$	

[5]

3 Coal is a fuel is made up of mostly elemental carbon.

(a) 5 kg of impure coal is burnt in an excess of air. The CO_2 produced was found to have a volume of 9600 dm^3 . Calculate the percentage purity of the carbon in coal.

[3]

(b) It was found that the impurity of the coal was sulfur.

The gas produced from burning sulfur was bubbled through aqueous potassium manganate(VII) and a colour change was observed.

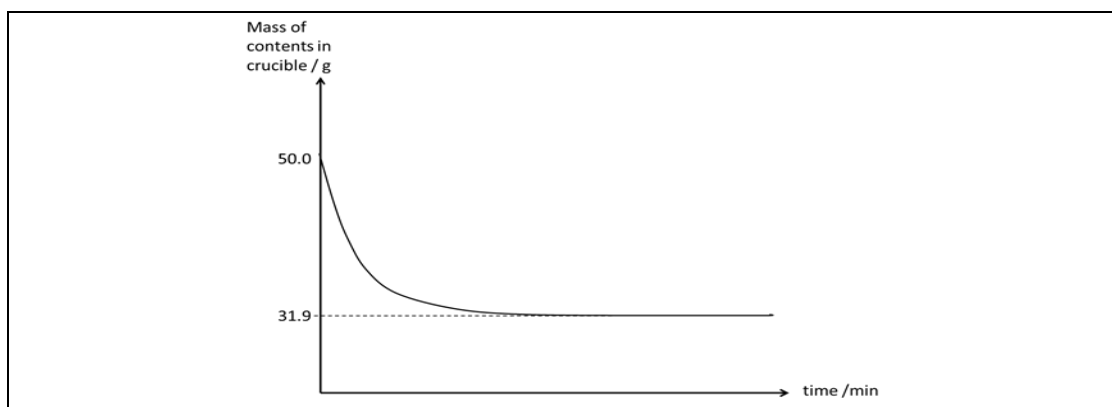
State:

- (i) The colour change observed _____ [1]
 (ii) The nature of the gas _____ [1]

4 Hydrated iron(II) chloride can exist as a variety of hydrates, where the number of molecules of water of crystallisation differs.

A sample of an unknown hydrated iron(II) chloride salt with formula $\text{FeCl}_2 \cdot n\text{H}_2\text{O}$ was weighed, and then heated strongly under a Bunsen flame. The mass was measured every minute until it reached a constant.

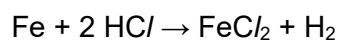
The graph below shows how the mass changes over time.



(a) Determine the value of n .

[3]

(b) Iron(II) chloride is prepared in a reaction as shown by the equation below:



Explain, in terms of changes in oxidation state, which substance is the **reducing agent**.

[2]

ANSWERS FOR REDOX MCQ

Paper 1

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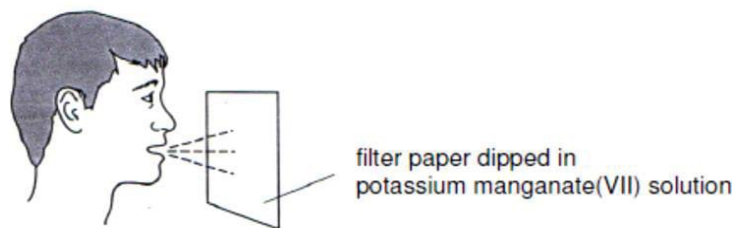
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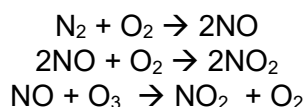
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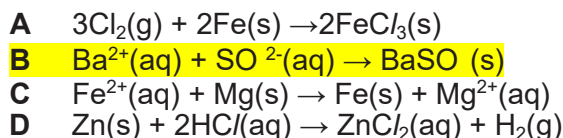
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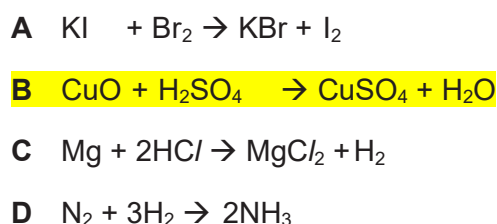
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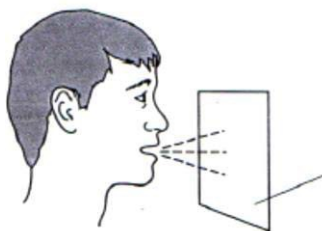
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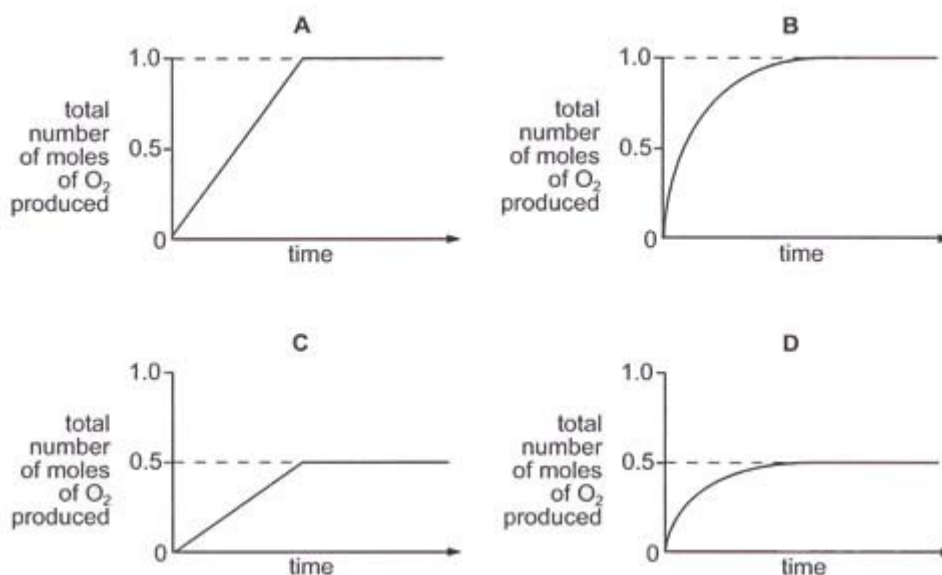


What is the oxidation number of platinum in each of these substances?

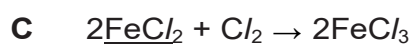
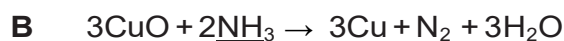
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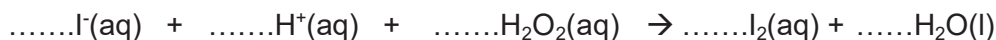
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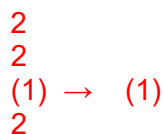
ANSWERS FOR REDOX STRUCTURED QUESTIONS

Paper 2 Section A

1 The reaction below is an example of a redox reaction.



(a) Balance the equation by inserting numbers (if necessary) on the dotted lines provided. [1]



(b) Identify the oxidising agent in this reaction. Explain your answer using oxidation states.

H₂O₂ is the oxidizing agent.

It oxidizes I⁻ to I₂ which increases in oxidation number from -1 (I⁻) to 0 (I₂).
[2]

(c) What colour change will be seen when this reaction is carried out?

Colourless solution turns yellow/ brown

.....[1]

[Total: 4]

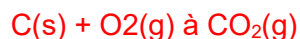
2 Name the following chemical processes.

	reaction	name of process
(i)	$\text{SiO}_2 + 2\text{NaOH} \rightarrow \text{Na}_2\text{SiO}_3 + \text{H}_2\text{O}$	Neutralization
(ii)	$\text{H}_2\text{SO}_4 + \text{CaCl}_2 \rightarrow 2\text{HCl} + \text{CaSO}_4$	Precipitation
(iii)	$\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$	Oxidation
(iv)	$\text{MgBr}_2 + \text{F}_2 \rightarrow \text{MgF}_2 + \text{Br}_2$	displacement/ redox
(v)	$\text{CuCO}_3 \rightarrow \text{CuO} + \text{CO}_2$	thermal decomposition / decomposition

[5]

3 Coal is a fuel is made up of mostly elemental carbon.

(a) 5 kg of impure coal is burnt in an excess of air. The CO₂ produced was found to have a volume of 9600 dm³. Calculate the percentage purity of the carbon in coal.



no of moles of CO₂ = $9600 \div 24 = 400.00$ mol (5 sf) [1]

1 mole of CO₂ is produced from 1 mole of C

hence, no of moles of C is 400.00 mol

mass of C = $400.00 \times 12 = 4800.0$ g [1]

percentage purity = $(4800.0 \div 5000) \times 100\% = 96.0\%$ (3 sf) [1]

[3]

(b) It was found that the impurity of the coal was sulfur.

The gas produced from burning sulfur was bubbled through aqueous potassium manganate(VII) and a colour change was observed.

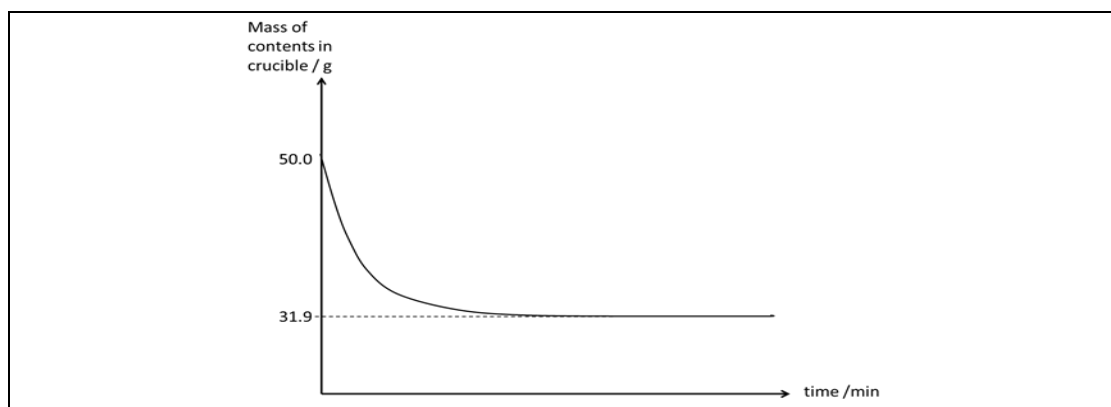
State:

- a. The colour change observed purple to colourless
[1]
- b. The nature of the gas reducing agent
[1]

4 Hydrated iron(II) chloride can exist as a variety of hydrates, where the number of molecules of water of crystallisation differs.

A sample of an unknown hydrated iron(II) chloride salt with formula FeCl₂.nH₂O was weighed, and then heated strongly under a Bunsen flame. The mass was measured every minute until it reached a constant.

The graph below shows how the mass changes over time.



(a) Determine the value of n .

mass of water = $50.0 \text{ g} - 31.9 \text{ g} = 18.1 \text{ g}$

no of moles of water = $18.1 \text{ g} \div 18 = 1.0056 \text{ mol}$ (5 sf) [1]

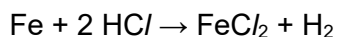
no of moles of iron(II) chloride = $31.9 \text{ g} \div 127 = 0.25118 \text{ mol}$ (5 sf) [1]

mole ratio of iron(II) chloride : water = $0.25118 : 1.0056 = 1 : 4.00$ (3 sf)

hence, $n = 4$ (nearest whole number) [1]

[3]

(b) Iron(II) chloride is prepared in a reaction as shown by the equation below:



Explain, in terms of changes in oxidation state, which substance is the **reducing agent**.

The reducing agent is Fe. Its oxidation state increased from 0 in Fe to +2 in FeCl_2
OR it reduced H from +1 in HCl to 0 in H_2 .

[2]
