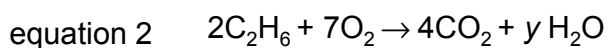
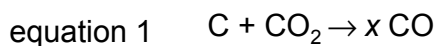


**Paper 1****Questions are applicable for both core and extended candidates**

- 1 The equations for two reactions are shown.



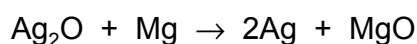
Which row shows the value of  $x$ , the value of  $y$  and the equations that are for redox reactions?

	value of $x$	value of $y$	redox reactions
<b>A</b>	1	3	equation 1 only
<b>B</b>	2	3	equations 1 and 2
<b>C</b>	2	6	equation 1 only
<b>D</b>	2	6	equations 1 and 2

- 2 Which row describes the changes that occur when metals burn in oxygen?

	temperature	metal
<b>A</b>	decreases	oxidised
<b>B</b>	decreases	reduced
<b>C</b>	increases	oxidised
<b>D</b>	increases	reduced

- 3 Silver oxide reacts with magnesium to make silver and magnesium oxide.



Which substance is oxidised in this reaction?

- A** magnesium
- B** magnesium oxide
- C** silver
- D** silver oxide

4 Four redox equations and statements about the equations are shown.

	reaction	statement
1	$\text{C} + \text{O}_2 \rightarrow \text{CO}_2$	carbon is oxidised
2	$\text{CO}_2 + \text{C} \rightarrow 2\text{CO}$	carbon dioxide is oxidised
3	$\text{CO}_2 + \text{C} \rightarrow 2\text{CO}$	carbon is oxidised
4	$\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$	iron(III) oxide is oxidised

Which statements about the equations are correct?

- A** 1 and 2      **B** 1 and 3      **C** 2 and 4      **D** 3 and 4

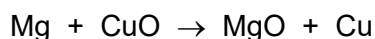
5 Which equation shows the reduction of copper?

- A**  $\text{CuO} + \text{C} \rightarrow \text{Cu} + \text{CO}$   
**B**  $2\text{CuS} + 3\text{O}_2 \rightarrow 2\text{CuO} + 2\text{SO}_2$   
**C**  $\text{Cu(g)} \rightarrow \text{Cu(l)}$   
**D**  $\text{Cu(l)} \rightarrow \text{Cu(s)}$

6 Which equation shows an oxidation reaction?

- A**  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$   
**B**  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$   
**C**  $\text{CaO} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O}$   
**D**  $\text{N}_2\text{O}_4 \rightarrow 2\text{NO}_2$

7 The equation for the reaction between magnesium and copper(II) oxide is shown.

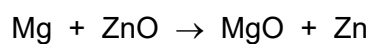


Which substance is oxidised?

- A** Cu      **B** CuO      **C** Mg      **D** MgO

**8** When magnesium is heated with zinc oxide a reaction occurs.

The equation is shown.



Which substance is oxidised?

- A** magnesium
- B** magnesium oxide
- C** zinc
- D** zinc oxide

## Paper 2

Questions are applicable for both core and extended candidates  
unless indicated in the question

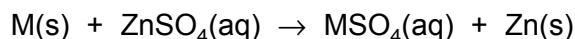
- 9 Hydrogen iodide is dissolved in water.



Which row describes the final colours seen when the solution is tested with damp red litmus paper and with acidified aqueous potassium manganate(VII)? **(extended only)**

	damp red litmus paper	acidified aqueous potassium manganate(VII)
<b>A</b>	blue	brown
<b>B</b>	blue	colourless
<b>C</b>	red	brown
<b>D</b>	red	colourless

- 10 The equation for the reaction of metal M with aqueous zinc sulfate is shown.



Which statement explains why metal M reacts with aqueous zinc sulfate? **(extended only)**

- A** Zinc is less reactive than M because M is able to accept electrons from zinc ions.
- B** Zinc is a more powerful reducing agent than M.
- C** Zinc is more reactive than M because it can lose electrons more easily than M.
- D** Zinc ions can remove electrons from M.

- 11 In which equation is the underlined substance acting as a reducing agent? **(extended only)**

- A** 3CO + Fe<sub>2</sub>O<sub>3</sub> → 2Fe + 3CO<sub>2</sub>
- B** CO<sub>2</sub> + C → 2CO
- C** CuO + H<sub>2</sub> → Cu + H<sub>2</sub>O
- D** CaO + H<sub>2</sub>O → Ca(OH)<sub>2</sub>

- 12** Ethanoic acid is made by reacting ethanol with acidified potassium manganate(VII).

Which type of reaction occurs when ethanol reacts with acidified potassium manganate(VII)?

(extended only)

- A** displacement
- B** fermentation
- C** oxidation
- D** neutralisation

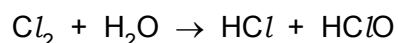
- 13** Sodium ions,  $\text{Na}^+$ , and oxygen ions,  $\text{O}^{2-}$ , combine with chromium ions to form a salt.

The salt sodium dichromate has the formula  $\text{Na}_2\text{Cr}_2\text{O}_7$ .

What is the oxidation state of chromium in this salt? (extended only)

- A** +2                      **B** +3                      **C** +6                      **D** +12

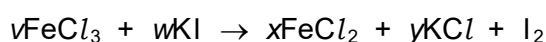
- 14** When chlorine gas dissolves in water a reaction occurs.



Which row of the table identifies the oxidation number for chlorine in the chlorine-containing species? (extended only)

	$\text{Cl}_2$	$\text{HCl}$	$\text{HClO}$
<b>A</b>	-1	-1	-1
<b>B</b>	0	-1	-1
<b>C</b>	-1	+1	+1
<b>D</b>	0	-1	+1

- 15** Aqueous iron(III) chloride,  $\text{FeCl}_3$ , reacts with aqueous potassium iodide,  $\text{KI}$ .



Which statements are correct? (extended only)

- 1 In the balanced equation,  $v$ ,  $w$ ,  $x$  and  $y$  have the same value.
- 2 Potassium iodide is an oxidising agent.
- 3 A dark brown solution is produced in the reaction.

- A** 1 and 2                      **B** 1 and 3                      **C** 2 only                      **D** 2 and 3