1 Aluminium reacts with iron(III) oxide as shown.

$$\text{iron(III) oxide} + \text{aluminium} \rightarrow \text{iron} + \text{aluminium oxide}$$

Which statement about this reaction is correct?

A Aluminium is oxidised.

B Aluminium oxide is reduced.

C Iron(III) oxide is oxidised.

D Iron is oxidised.

2 The equations below all show redox reactions.

$$Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$$

$$2ZnO + C \rightarrow 2Zn + CO_2$$

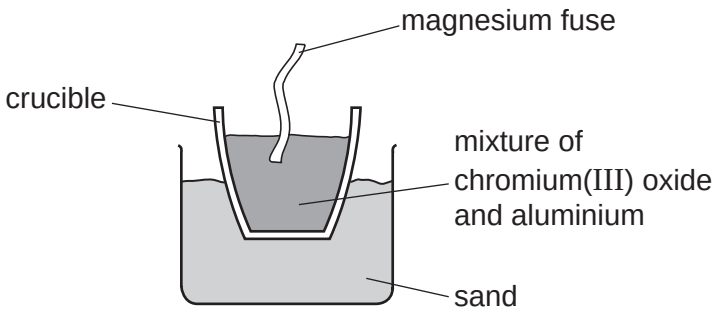
$$Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$$

$$2CO + 2NO \rightarrow 2CO_2 + N_2$$

Which oxide is oxidised in these reactions?

A Fe_2O_3 **B** CO **C** ZnO **D** NO

3 A violent reaction occurs when a mixture of chromium(III) oxide and aluminium is ignited with a magnesium fuse as shown.



The equation for the reaction is shown.

$$Cr_2O_3 + 2Al \rightarrow 2Cr + Al_2O_3$$

Which substance is oxidised in the reaction?

A aluminium

B aluminium oxide

C chromium

D chromium(III) oxide

4 The element vanadium, V, forms several oxides.

In which change is oxidation taking place?

A $VO_2 \rightarrow V_2O_3$

B $V_2O_5 \rightarrow VO_2$

C $V_2O_3 \rightarrow VO$

D $V_2O_3 \rightarrow V_2O_5$

5 The reaction between magnesium and carbon dioxide is represented by the following equation.

$$2Mg + CO_2 \rightarrow 2MgO + C$$

Which statement describes what happens in this reaction?

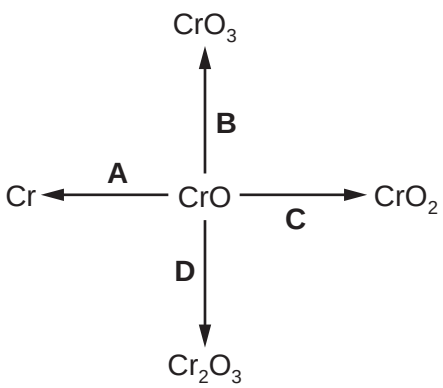
A Carbon is oxidised.

B Magnesium is reduced.

C Neither oxidation nor reduction happens.

D The carbon in carbon dioxide is reduced.

6 In which change is chromium(II) oxide, CrO, reduced?



7 In which equation does the oxidation of the underlined compound occur?

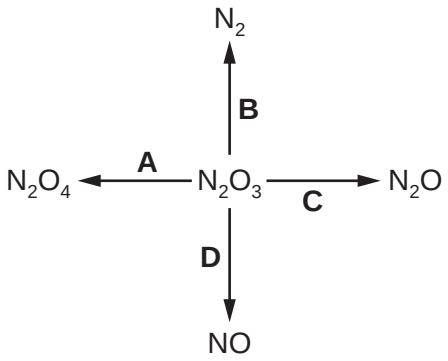
A $2CuO + C \rightarrow CO_2 + \underline{Cu}$

B $Fe_2O_3 + \underline{3CO} \rightarrow 2Fe + 3CO_2$

C $2Mg + O_2 \rightarrow \underline{2MgO}$

D $\underline{MnO_2} + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

8 In which change is N_2O_3 oxidised?



9 When copper is heated in air a black coating forms on the copper.

What happens to the copper in this reaction?

A The copper catches fire.

B The copper decomposes.

C The copper gains oxygen.

D The copper loses oxygen.

10 The equations for two reactions P and Q are given.

P $2\underline{NaNO_2} + O_2 \rightarrow 2NaNO_3$

Q $2\underline{HgO} \rightarrow 2Hg + O_2$

In which of these reactions does oxidation of the underlined substance occur?

	P	Q
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

11 Which equation shows an oxidation reaction?

A $C + O_2 \rightarrow CO_2$

B $CaCO_3 \rightarrow CaO + CO_2$

C $CaO + 2HCl \rightarrow CaCl_2 + H_2O$

D $N_2O_4 \rightarrow 2NO_2$

12 The equation shows a reaction that is reversed by changing the conditions.

$$CuSO_4.5H_2O \xrightarrow{\text{forward reaction}} CuSO_4 + 5H_2O$$

How can the forward reaction be reversed?

	by adding water	by heating
A	✓	✓
B	✓	✗
C	✗	✓
D	✗	✗

13 The reactions shown may occur in the air during a thunder storm.

$N_2 + O_2 \rightarrow 2NO$

$2NO + O_2 \rightarrow 2NO_2$

$NO + O_3 \rightarrow NO_2 + O_2$

Which row shows what happens to the reactant molecules in each of these reactions?

	N_2	NO	O_3
A	oxidised	oxidised	oxidised
B	oxidised	oxidised	reduced
C	reduced	reduced	oxidised
D	reduced	reduced	reduced

14 Equations P and Q represent two reactions which occur inside a blast furnace.

P $F_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

Q $CaCO_3 \rightarrow CaO + CO_2$

Which type of reactions are P and Q?

	P	Q
A	redox	redox
B	redox	thermal decomposition
C	thermal decomposition	redox
D	thermal decomposition	thermal decomposition

15 The equations represent redox reactions.

In which equation is the underlined substance acting as a reducing agent?

A $3\underline{CO} + Fe_2O_3 \rightarrow 2Fe + 3CO_2$

B $\underline{CO_2} + C \rightarrow 2CO$

C $\underline{CuO} + H_2 \rightarrow Cu + H_2O$

D $\underline{CaO} + H_2O \rightarrow Ca(OH)_2$

16 Which change is an oxidation?

A FeO to Fe_2O_3

B Fe_2O_3 to FeO

C H_2O_2 to H_2O

D H_2O to H_2

17 Which statement describes what happens in the reaction shown?

$$2Mg + CO_2 \rightarrow 2MgO + C$$

A Carbon and magnesium are both oxidised.

B Carbon is oxidised and magnesium oxide is reduced.

C Magnesium is oxidised and carbon dioxide is reduced.

D Magnesium oxide and carbon dioxide are both reduced.

18 The element vanadium, V, forms several oxides.

In which change is oxidation taking place?

A $VO_2 \rightarrow V_2O_3$

B $V_2O_5 \rightarrow VO_2$

C $V_2O_3 \rightarrow VO$

D $V_2O_3 \rightarrow V_2O_5$

19 In which reaction is lead(II) oxide, PbO, oxidised?

A $PbO + C \rightarrow Pb + CO$

B $PbO + CO \rightarrow Pb + CO_2$

C $PbO + H_2 \rightarrow Pb + H_2O$

D $2PbO + O_2 \rightarrow 2PbO_2$

20 The red colour in some pottery glazes may be formed as a result of the reactions shown.

$$CuCO_3 \xrightarrow{\text{heat}} CuO + CO_2$$

$$CuO + SnO \longrightarrow Cu + SnO_2$$

These equations show that ……1…… is oxidised and ……2…… is reduced.

Which substances correctly complete gaps 1 and 2 in the above sentence?

	1	2
A	CO_2	SnO_2
B	$CuCO_3$	CuO
C	CuO	SnO
D	SnO	CuO

21 Iron is extracted from iron oxide using carbon monoxide as shown in the equation.

iron oxide + carbon monoxide → iron + carbon dioxide

What does the equation show?

A Carbon monoxide is oxidised to carbon dioxide.

B Carbon monoxide is reduced to carbon dioxide.

C Iron is oxidised to iron oxide.

D Iron oxide is oxidised to iron.

22 The equations represent redox reactions.

In which equation is the underlined substance acting as a reducing agent?

A $\underline{CaO} + H_2O \rightarrow Ca(OH)_2$

B $\underline{CO_2} + C \rightarrow 2CO$

C $\underline{CuO} + H_2 \rightarrow Cu + H_2O$

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

23 The reactions shown may occur in the air during a thunder storm.

$N_2 + O_2 \rightarrow 2NO$

$2NO + O_2 \rightarrow 2NO_2$

$NO + O_3 \rightarrow NO_2 + O_2$

Which line shows what happens to the reactant molecules in each of these reactions?

	N_2	NO	O_3
A	oxidised	oxidised	oxidised
B	oxidised	oxidised	reduced
C	reduced	reduced	oxidised
D	reduced	reduced	reduced