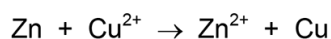


7.4. REDOX

7.4 Redox

01. 0620_s21_qp_21 Q: 16

An example of a redox reaction is shown.



Which statement about the reaction is correct?

- A Zn is the oxidising agent and it oxidises Cu^{2+} .
- B Zn is the oxidising agent and it reduces Cu^{2+} .
- C Zn is the reducing agent and it oxidises Cu^{2+} .
- D Zn is the reducing agent and it reduces Cu^{2+} .

02. 0620_s21_qp_23 Q: 32

The formulae of two compounds of manganese are MnO_2 and KMnO_4 .

In these two compounds the oxidation state of potassium is +1 and the oxidation state of oxygen is -2.

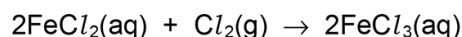
What are the oxidation states of manganese in each of these two compounds?

	MnO_2	KMnO_4
A	+2	+3
B	+2	+7
C	+4	+3
D	+4	+7

03. 0620_w21_qp_21 Q: 16

Iron(II) chloride solution reacts with chlorine gas.

The equation is shown.



Which statements about this reaction are correct?

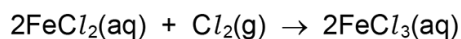
- 1 Fe^{2+} ions are reduced to Fe^{3+} ions.
- 2 Chlorine acts as a reducing agent.
- 3 Fe^{2+} ions each lose an electron.
- 4 Cl_2 molecules are reduced to Cl^- ions.

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

04. 0620_w21_qp_22 Q: 16

Iron(II) chloride solution reacts with chlorine gas.

The equation is shown.



Which statements about this reaction are correct?

- 1 Fe^{2+} ions are reduced to Fe^{3+} ions.
- 2 Chlorine acts as a reducing agent.
- 3 Fe^{2+} ions each lose an electron.
- 4 Cl_2 molecules are reduced to Cl^- ions.

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

05. 0620_m20_qp_22 Q: 17

In which reaction is the underlined compound acting as a reducing agent?

- A** $\underline{\text{CO}_2} + \text{C} \rightarrow 2\text{CO}$
- B** $2\text{CuO} + \underline{\text{C}} \rightarrow 2\text{Cu} + \text{CO}_2$
- C** $\underline{\text{Fe}_2\text{O}_3} + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
- D** $\text{CaCO}_3 + \underline{2\text{HCl}} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
-

06. 0620_p20_qp_20 Q: 20

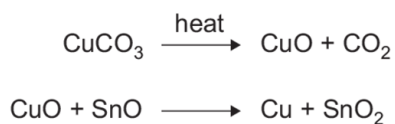
Which of these reactions shows only reduction?

- A** $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
- B** $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
- C** $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- D** $\text{Mg} + \text{ZnSO}_4 \rightarrow \text{Zn} + \text{MgSO}_4$
-

7.4. REDOX

07. 0620_p20_qp_20 Q: 21

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



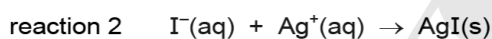
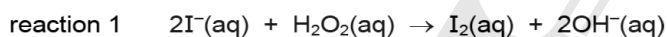
These equations show that1..... is oxidised and2..... is reduced.

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

08. 0620_s20_qp_21 Q: 17

The equations for two reactions of iodide ions are shown.



Which statement is correct?

- A** Both reactions are redox reactions.
- B** Neither reaction is a redox reaction.
- C** Only reaction 1 is a redox reaction.
- D** Only reaction 2 is a redox reaction.

09. 0620_s20_qp_22 Q: 17

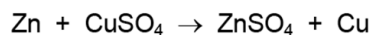
When aqueous iron(III) chloride is added to aqueous potassium iodide a chemical reaction occurs and iodine is formed.

Which statement is correct?

- A** Iodide ions are oxidised, they gain electrons in this reaction.
- B** Iodide ions are oxidised, they lose electrons in this reaction.
- C** Iron(III) chloride is oxidised in this reaction.
- D** Neither iodide ions nor iron(III) chloride is oxidised in this reaction.

10. 0620_s20_qp_23 Q: 17

The equation for the reaction between zinc and aqueous copper(II) sulfate is shown.

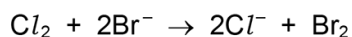


Which statement is correct?

- A The oxidation state of the oxidising agent has changed from 0 to +2.
 - B The oxidation state of the reducing agent has changed from 0 to +2.
 - C The oxidation state of the reducing agent has changed from +2 to 0.
 - D This is not a redox reaction. The solution changes from colourless to blue.
-

11. 0620_w20_qp_21 Q: 21

The reaction between chlorine and bromide ions is a redox reaction.



What is the change in oxidation state of the reducing agent in this reaction?

- A -2 to 0
 - B -1 to 0
 - C 0 to -1
 - D 0 to +1
-

12. 0620_w20_qp_22 Q: 19

During the manufacture of sulfuric acid, sulfur dioxide is converted to sulfur trioxide.



Which type of reaction is this?

- A displacement
 - B neutralisation
 - C oxidation
 - D thermal decomposition
-

7.4. REDOX

13. 0620_w20_qp_22 Q: 20

The equation for a redox reaction is shown.



Which element is reduced?

- A chlorine
 - B iron
 - C oxygen
 - D sulfur
-

14. 0620_w20_qp_23 Q: 17

Which reaction of hydrochloric acid is a redox reaction?

- A $2\text{Na} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2$
 - B $\text{Na}_2\text{O} + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O}$
 - C $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
 - D $\text{Na}_2\text{CO}_3 + 2\text{HCl} \rightarrow 2\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
-

15. 0620_w20_qp_23 Q: 21

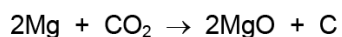
Which metal has variable oxidation states?

- A aluminium
 - B calcium
 - C copper
 - D sodium
-


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16. 0620_m19_qp_22 Q: 18

The reaction between magnesium and carbon dioxide is shown in the equation.



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.
-

17. 0620_m19_qp_22 Q: 19

Which changes involve reduction?

- 1 $2\text{I}^- \rightarrow \text{I}_2 + 2\text{e}^-$
- 2 $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
- 3 $\text{Al}^{3+} + 3\text{e}^- \rightarrow \text{Al}$
- 4 $\text{Pb}^{2+} + \text{SO}_4^{2-} \rightarrow \text{PbSO}_4$

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

18. 0620_s19_qp_21 Q: 16

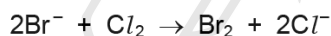
Which changes represent oxidation?

- 1 $2\text{I}^- \rightarrow \text{I}_2 + 2\text{e}^-$
- 2 $\text{Cr(VI)} \rightarrow \text{Cr(III)}$
- 3 $\text{Fe(II)} \rightarrow \text{Fe(III)}$

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

19. 0620_s19_qp_22 Q: 16

The ionic equation for the reaction of aqueous potassium bromide with chlorine gas is shown.



Which statement is correct?

- A** Bromide ions are oxidised by gaining electrons.
B Bromide ions are oxidised by losing electrons.
C Chlorine is oxidised by gaining electrons.
D Chlorine is oxidised by losing electrons.
-

20. 0620_s19_qp_23 Q: 16

Which changes represent reduction?

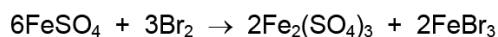
- 1 $\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$
- 2 $\text{Mn(VII)} \rightarrow \text{Mn(II)}$
- 3 sulfate(IV) \rightarrow sulfate(VI)

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

7.4. REDOX

21. 0620_w19_qp_21 Q: 18

The equation for the reaction between iron(II) sulfate and bromine is shown.

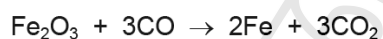


Which row identifies the oxidising agent and the reducing agent?

	oxidising agent	reducing agent
A	Br_2	FeSO_4
B	FeSO_4	Br_2
C	FeBr_3	$\text{Fe}_2(\text{SO}_4)_3$
D	$\text{Fe}_2(\text{SO}_4)_3$	FeBr_3

22. 0620_w19_qp_22 Q: 18

In the blast furnace, iron is formed when iron(III) oxide reacts with carbon monoxide in a redox reaction.



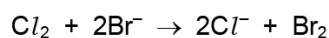
Which substance is the oxidising agent and which substance is the reducing agent?

	oxidising agent	reducing agent
A	CO	Fe_2O_3
B	CO_2	Fe
C	Fe	CO_2
D	Fe_2O_3	CO

23. 0620_w19_qp_23 Q: 18

Chlorine displaces bromine from aqueous potassium bromide.

The ionic equation for the reaction is shown.

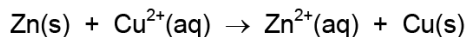


Which statement about this reaction is correct?

- A** Bromide ions act as an oxidising agent.
- B** Bromide ions are oxidised when electrons are lost.
- C** Chlorine acts as a reducing agent.
- D** Chlorine is reduced when electrons are lost.

24. 0620_m18_qp_22 Q: 14

The ionic equation for the reaction between zinc and aqueous copper ions is shown.

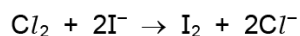


Which statement about this reaction is correct?

- A Copper ions are oxidised and their oxidation state changes.
 - B Copper ions are reduced because they lose electrons.
 - C Zinc atoms are oxidised and their oxidation state changes.
 - D Zinc atoms are reduced because they gain electrons.
-

25. 0620_s18_qp_21 Q: 16

Chlorine displaces iodide ions from potassium iodide.



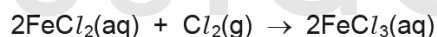
What is the oxidising agent?

- A chloride ions
 - B chlorine
 - C iodide ions
 - D iodine
-

26. 0620_s18_qp_22 Q: 16

Iron(II) chloride solution reacts with chlorine gas.

The equation is shown.



Which statements about this reaction are correct?

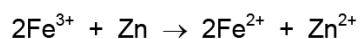
- 1 Fe^{2+} ions are reduced to Fe^{3+} ions.
- 2 Chlorine acts as a reducing agent.
- 3 Fe^{2+} ions each lose an electron.
- 4 Cl_2 molecules are reduced to Cl^- ions.

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

7.4. REDOX

27. 0620_s18_qp_23 Q: 16

The equation for a redox reaction is shown.



Which statements are correct?

- 1 Fe^{3+} is reduced to form Fe^{2+} .
- 2 Zn oxidises the Fe^{3+} ions.
- 3 Fe^{3+} is an oxidising agent.

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

28. 0620_w18_qp_21 Q: 16

An excess of iron(II) chloride is added to acidified potassium manganate(VII).

Which statements are correct?

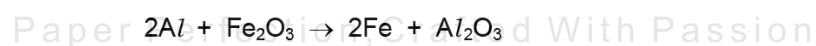
- 1 The purple colour disappears.
- 2 Iron(II) is reduced to iron(III).
- 3 Manganate(VII) ions are oxidised to manganese(II) ions.
- 4 Potassium manganate(VII) is an oxidising agent.

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

29. 0620_w18_qp_22 Q: 16

The thermite reaction can be used to produce iron from iron(III) oxide.

The equation for the reaction is shown.



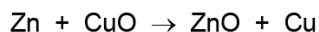
Which statements about this reaction are correct?

- 1 Aluminium is the oxidising agent.
- 2 Aluminium is less reactive than iron.
- 3 Electrons are transferred from aluminium to iron.
- 4 The iron in the iron(III) oxide is reduced.

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

30. 0620_w18_qp_23 Q: 16

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

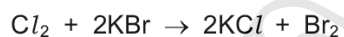


Which row shows the oxidising agent and the reducing agent?

	oxidising agent	reducing agent
A	CuO	Cu
B	CuO	Zn
C	Zn	CuO
D	Zn	ZnO

31. 0620_m17_qp_22 Q: 17

Chlorine displaces bromine from a solution of potassium bromide.



What is the oxidising agent in this reaction?

- A** bromide ions
- B** bromine
- C** chloride ions
- D** chlorine

32. 0620_s17_qp_21 Q: 17

An example of a redox reaction is shown.



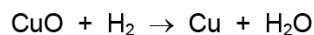
Which statement about the reaction is correct?

- A** Zn is the oxidising agent and it oxidises Cu^{2+} .
- B** Zn is the oxidising agent and it reduces Cu^{2+} .
- C** Zn is the reducing agent and it oxidises Cu^{2+} .
- D** Zn is the reducing agent and it reduces Cu^{2+} .

7.4. REDOX

33. 0620_w17_qp_21 Q: 14

Copper(II) oxide reacts with hydrogen.



Which row is correct?

	oxidising agent	reducing agent
A	H ₂	CuO
B	CuO	H ₂
C	H ₂ O	Cu
D	Cu	H ₂ O

34. 0620_w17_qp_22 Q: 14

Copper metal donates electrons to silver ions.

Zinc metal donates electrons to copper ions.

What is the strongest reducing agent?

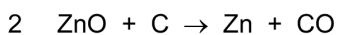
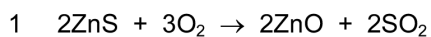
- A** copper ions
- B** copper metal
- C** silver ions
- D** zinc metal

35. 0620_m16_qp_22 Q: 16

Zinc is extracted from zinc blende by roasting it in air to form zinc oxide.

The zinc oxide is then heated with carbon to form zinc.

The equations for the reactions are shown.



Which statement about reactions 1 and 2 is **not** correct?

- A** In reaction 1 the oxidation state of sulfur increases and it is oxidised.
- B** In reaction 1 the oxidation state of zinc increases and it is oxidised.
- C** In reaction 2 the carbon acts as a reducing agent and it is oxidised.
- D** In reaction 2 the oxidation state of zinc decreases and it is reduced.

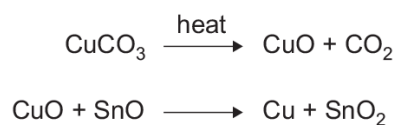
36. 0620_p16_qp_20 Q: 20

Which of these reactions shows only reduction?

- A** $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
B $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$
C $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
D $\text{Mg} + \text{ZnSO}_4 \rightarrow \text{Zn} + \text{MgSO}_4$
-

37. 0620_p16_qp_20 Q: 21

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



These equations show that1..... is oxidised and2..... 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

38. 0620_s16_qp_21 Q: 17

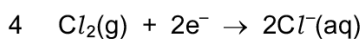
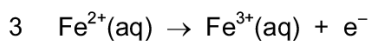
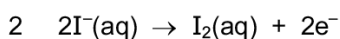
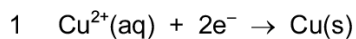
Which equation represents a reduction reaction?

- A** $\text{Fe}^{2+} + \text{e}^- \rightarrow \text{Fe}^{3+}$
B $\text{Fe}^{2+} \rightarrow \text{Fe}^{3+} + \text{e}^-$
C $\text{Fe}^{3+} + \text{e}^- \rightarrow \text{Fe}^{2+}$
D $\text{Fe}^{3+} \rightarrow \text{Fe}^{2+} + \text{e}^-$
-

7.4. REDOX

39. 0620_w16_qp_21 Q: 17

Four ionic half-equations are shown.



Which statement is correct?

- A In equation 1, copper(II) ions are oxidised to copper.
 - B In equation 2, iodide ions are reduced to iodine.
 - C In equation 3, iron(II) ions are oxidised to iron(III) ions.
 - D In equation 4, chlorine is oxidised to chloride ions.
-

40. 0620_w16_qp_22 Q: 17

Chromium forms the compound chromium(III) sulfate.

What does the (III) represent?

- A the charge on a sulfate ion
 - B the number of chromium ions combined with one sulfate ion
 - C the number of sulfate ions combined with one chromium ion
 - D the oxidation state of chromium
-

41. 0620_w16_qp_23 Q: 17

Which change represents an oxidation reaction?

- A chlorine changes to chlorate(I) ions
 - B chlorine changes to chloride ions
 - C copper(II) ions change to copper
 - D potassium manganate(VII) ions change to potassium manganate(VI) ions
-

SN	Paper	Q. No.	Answer
01	0620_s21_qp_21	16	D
02	0620_s21_qp_23	32	D
03	0620_w21_qp_21	16	D
04	0620_w21_qp_22	16	D
05	0620_m20_qp_22	17	B
06	0620_p20_qp_20	20	A
07	0620_p20_qp_20	21	D
08	0620_s20_qp_21	17	C
09	0620_s20_qp_22	17	B
10	0620_s20_qp_23	17	B
11	0620_w20_qp_21	21	B
12	0620_w20_qp_22	19	C
13	0620_w20_qp_22	20	A
14	0620_w20_qp_23	17	A
15	0620_w20_qp_23	21	C
16	0620_m19_qp_22	18	D
17	0620_m19_qp_22	19	C
18	0620_s19_qp_21	16	B
19	0620_s19_qp_22	16	B
20	0620_s19_qp_23	16	A
21	0620_w19_qp_21	18	A
22	0620_w19_qp_22	18	D
23	0620_w19_qp_23	18	B
24	0620_m18_qp_22	14	C
25	0620_s18_qp_21	16	B
26	0620_s18_qp_22	16	D
27	0620_s18_qp_23	16	C
28	0620_w18_qp_21	16	B
29	0620_w18_qp_22	16	D
30	0620_w18_qp_23	16	B
31	0620_m17_qp_22	17	D
32	0620_s17_qp_21	17	D
33	0620_w17_qp_21	14	B
34	0620_w17_qp_22	14	D
35	0620_m16_qp_22	16	B
36	0620_p16_qp_20	20	A
37	0620_p16_qp_20	21	D
38	0620_s16_qp_21	17	C
39	0620_w16_qp_21	17	C
40	0620_w16_qp_22	17	D
41	0620_w16_qp_23	17	A