Q1.

Which compound contains a chlorine atom with an oxidation state of +4?

A $KClO_4$ ⬭

B CCl_4 ⬭

C ClO_2 ⬭

D ClO_2F ⬭

(Total 1 mark)

Q2.

Which equation does **not** show the reduction of a transition metal?

A $TiCl_4 + 2\ Mg \rightarrow Ti + 2\ MgCl_2$ ⬭

B $2\ FeCl_3 + 2\ KI \rightarrow 2\ FeCl_2 + 2\ KCl + I_2$ ⬭

C $MnO_2 + 4\ HCl \rightarrow MnCl_2 + Cl_2 + 2\ H_2O$ ⬭

D $CoO + 4\ HCl \rightarrow [CoCl_4]^{2-} + H_2O + 2\ H^+$ ⬭

(Total 1 mark)

Q3.

NO_2^- ions can be reduced in acidic solution to NO How many electrons are gained when each NO_2^- ion is reduced?

A 1 ⬭

B 2 ⬭

C 3 ⬭

D 4 ⬭

(Total 1 mark)

Q4.

Which compound contains chlorine in an oxidation state of +1?

A Cl_2O ○

B $KClO_3$ ○

C ClF_3 ○

D CCl_4 ○

(Total 1 mark)

Q5.

In which conversion is the metal reduced?

A $Cr_2O_7^{2-} \rightarrow CrO_4^{2-}$ ○

B $MnO_4^{2-} \rightarrow MnO_4^-$ ○

C $TiO_2 \rightarrow TiO_3^{2-}$ ○

D $VO_3^- \rightarrow VO^{2+}$ ○

(Total 1 mark)

Q6.

Which equation does **not** represent a redox reaction?

A $Mg + 2\ HCl \rightarrow MgCl_2 + H_2$ ○

B $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ ○

C $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ ○

D $CuO + 2\ HCl \rightarrow CuCl_2 + H_2O$ ○

(Total 1 mark)

Q7.

Which of these is **not** a redox reaction?

A $Cu_2O + H_2SO_4 \longrightarrow CuSO_4 + Cu + H_2O$ ⬭

B $MgO + 2HCl \longrightarrow MgCl_2 + H_2O$ ⬭

C $SnCl_2 + HgCl_2 \longrightarrow Hg + SnCl_4$ ⬭

D $MnO_2 + 4HCl \longrightarrow MnCl_2 + 2H_2O + Cl_2$ ⬭

(Total 1 mark)

Q8.

Which species is **not** produced by a redox reaction between solid sodium iodide and concentrated sulfuric acid?

A Na_2SO_4 ⬭

B H_2S ⬭

C S ⬭

D SO_2 ⬭

(Total 1 mark)

Q9.

V_2O_5 can be used as a catalyst in the Contact Process.

Which is a step in the Contact Process in which the vanadium is oxidised?

A $SO_2 + V_2O_5 \longrightarrow SO_3 + 2VO_2$ ⬭

B $SO_3 + 2VO_2 \longrightarrow SO_2 + V_2O_5$ ⬭

C $2VO_2 + \frac{1}{2}O_2 \longrightarrow V_2O_5$ ⬭

D $V_2O_5 \longrightarrow 2VO_2 + \frac{1}{2}O_2$ ⬭

(Total 1 mark)

Q10.

Which of these shows nitrogen in its correct oxidation states in the compounds given?

	NH_3	N_2O	HNO_2	
A	+3	−1	+5	○
B	−3	+1	+3	○
C	−3	+1	−5	○
D	+3	−1	−3	○

(Total 1 mark)

Q11.

Which of these is a redox reaction?

A $CaO + SiO_2 \longrightarrow CaSiO_3$ ○

B $H_2SO_4 + Na_2O \longrightarrow Na_2SO_4 + H_2O$ ○

C $NaBr + H_2SO_4 \longrightarrow NaHSO_4 + HBr$ ○

D $Mg + S \longrightarrow MgS$ ○

(Total 1 mark)

Q12.

Which of these species is the best reducing agent?

A Cl_2 ○

B Cl^- ○

C I_2 ○

D I^- ○

(Total 1 mark)

Q13.

Which of the following shows chlorine in its correct oxidation states in the compounds shown?

	HCl	$KClO_3$	HClO	
A	−1	+3	+1	⬭
B	+1	−5	−1	⬭
C	−1	+5	+1	⬭
D	+1	+5	−1	⬭

(Total 1 mark)

Q14.

Which substance is **not** produced in a redox reaction when solid sodium iodide reacts with concentrated sulfuric acid?

A H_2S ⬭

B HI ⬭

C SO_2 ⬭

D I_2 ⬭

(Total 1 mark)

Q15.

In which reaction is hydrogen acting as an oxidising agent?

A $Cl_2 + H_2 \longrightarrow 2HCl$ ⬭

B $(CH_3)_2CO + H_2 \longrightarrow (CH_3)_2CHOH$ ⬭

C $N_2 + 3H_2 \longrightarrow 2NH_3$ ⬭

D $2Na + H_2 \longrightarrow 2NaH$ ⬭

(Total 1 mark)

Q16.

In which reaction is the metal oxidised?

A $2Cu^{2+} + 4I^- \longrightarrow 2CuI + I_2$ ⬭

B $[Fe(H_2O)_6]^{3+} + Cl^- \longrightarrow [Fe(H_2O)_5(Cl)]^{2+} + H_2O$ ⬭

C $[CoCl_4]^{2-} + 6H_2O \longrightarrow [Co(H_2O)_6]^{2+} + 4Cl^-$ ⬭

D $Mg + S \longrightarrow MgS$ ⬭

(Total 1 mark)

Q17.

Which species contains an element with an oxidation state of +4?

A NO_2^+ ⬭

B ClO_3^- ⬭

C H_2SO_3 ⬭

D PCl_5 ⬭

(Total 1 mark)

Q18.

Refer to the unbalanced equation below when answering this question.

$$K_2Cr_2O7 + 3H_2C_2O_4 + \_H_2SO_4 \longrightarrow Cr_2(SO_4)_3 + \_H_2O + 6CO_2 + K_2SO_4$$

In the balanced equation the mole ratio for sulfuric acid to water is

A 1 : 4 ⬭

B 1 : 2 ⬭

C 4 : 7 ⬭

D 4 : 9 ⬭

(Total 1 mark)

Q19.

Refer to the unbalanced equation below when answering this question.

$$K_2Cr_2O7 + 3H_2C_2O_4 + \_H_2SO_4 \longrightarrow Cr_2(SO_4)_3 + \_H_2O + 6CO_2 + K_2SO_4$$

What is the reducing agent in this reaction?

A H^+ ⬭

B $C_2O_4^{2-}$ ⬭

C K^+ ⬭

D $Cr_2O_7^{2-}$ ⬭

(Total 1 mark)