

Q1.

This question is about redox reactions.

- (a) State, in terms of electrons, the meaning of the term oxidising agent.

(1)

- (b) $\text{Cr}_2\text{O}_7^{2-}$ can oxidise SO_3^{2-} in acidic conditions to form Cr^{3+} and SO_4^{2-}

Deduce a half-equation for the oxidation of SO_3^{2-} to SO_4^{2-}

Deduce a half-equation for the reduction of $\text{Cr}_2\text{O}_7^{2-}$ to Cr^{3+}

Deduce the overall equation for the oxidation of SO_3^{2-} by $\text{Cr}_2\text{O}_7^{2-}$

Half-equation for the oxidation of SO_3^{2-} to SO_4^{2-}

Half-equation for the reduction of $\text{Cr}_2\text{O}_7^{2-}$ to Cr^{3+}

Overall equation

(3)

(Total 4 marks)

Q2.

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)

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?

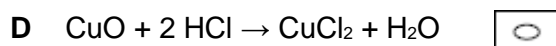
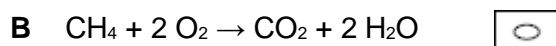
- A Cl_2O
- B KClO_3
- C ClF_3
- D CCl_4

(Total 1 mark)**Q5.**

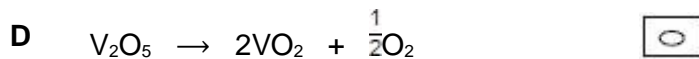
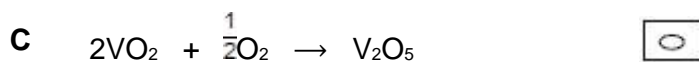
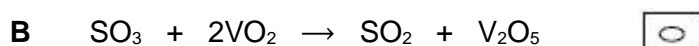
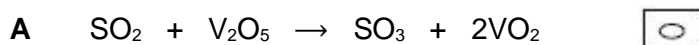
In which conversion is the metal reduced?

- A $\text{Cr}_2\text{O}_7^{2-} \rightarrow \text{CrO}_4^{2-}$
- B $\text{MnO}_4^{2-} \rightarrow \text{MnO}_4^-$
- C $\text{TiO}_2 \rightarrow \text{TiO}_3^{2-}$
- D $\text{VO}_3^- \rightarrow \text{VO}^{2+}$

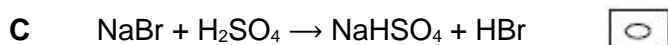
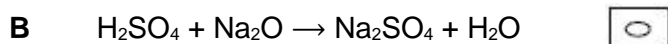
(Total 1 mark)

Q6.Which equation does **not** represent a redox reaction?**(Total 1 mark)****Q7.** 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?

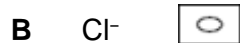
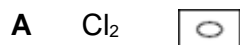
**(Total 1 mark)****Q8.**

Which of these is a redox reaction?

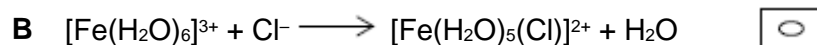
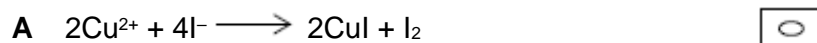
**(Total 1 mark)**

Q9.

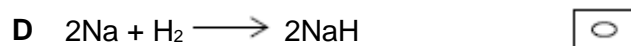
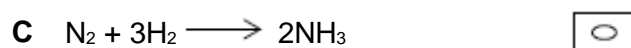
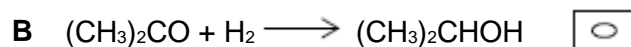
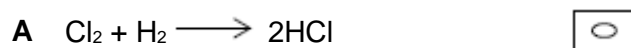
Which of these species is the best reducing agent?

**(Total 1 mark)****Q10.**

In which reaction is the metal oxidised?

**(Total 1 mark)****Q11.**

In which reaction is hydrogen acting as an oxidising agent?

**(Total 1 mark)**

Q12.

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

	HCl	KClO ₃	HClO	
A	-1	+3	+1	<input type="checkbox"/>
B	+1	-5	-1	<input type="checkbox"/>
C	-1	+5	+1	<input type="checkbox"/>
D	+1	+5	-1	<input type="checkbox"/>

(Total 1 mark)

Q13.

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

	NH ₃	N ₂ O	HNO ₂	
A	+3	-1	+5	<input type="checkbox"/>
B	-3	+1	+3	<input type="checkbox"/>
C	-3	+1	-5	<input type="checkbox"/>
D	+3	-1	-3	<input type="checkbox"/>

(Total 1 mark)

Q14.

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

- A** $\text{Cu}_2\text{O} + \text{H}_2\text{SO}_4 \rightarrow \text{CuSO}_4 + \text{Cu} + \text{H}_2\text{O}$
- B** $\text{MgO} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2\text{O}$
- C** $\text{SnCl}_2 + \text{HgCl}_2 \rightarrow \text{Hg} + \text{SnCl}_4$
- D** $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$