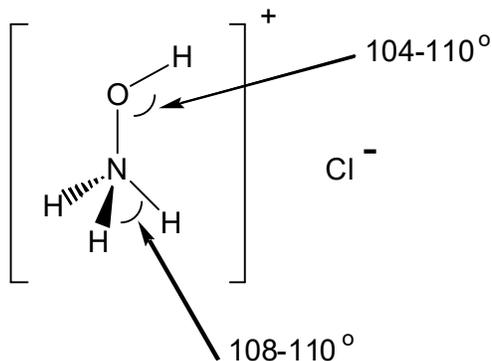


6. Hydroxylamine and its reaction with iron (III) ions

(a)



(1)

no marks for structure except if no angles - then 1 mark.

(1)

(b) Original $\text{NH}_3\text{OH}^+\text{Cl}^-$ solution $1\text{g in } 250\text{cm}^3 = 4\text{gdm}^{-3}$
 $= \frac{4.00}{69.5} = 0.0576 \text{ mol dm}^{-3}$

25cm^3 aliquot contains $\frac{25}{1000} \times 0.0576 = 0.00144$ moles

28.9cm^3 of $0.0200 \text{ mol dm}^{-3} \text{ MnO}_4^-$ contains $\frac{28.9}{1000} \times 0.0200 = 0.000578$ moles (1)

1 mole $\text{MnO}_4^- = 5$ moles Fe^{2+}

Therefore No. of moles $\text{Fe}^{2+} = 5 \times 0.000578 = 0.00289$ moles

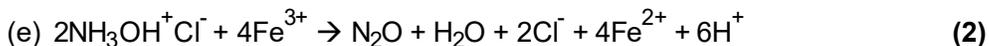
Ratio $\text{NH}_3\text{OH}^+\text{Cl}^- : \text{Fe}^{2+} = \underline{1:2}$ (1)

(c) $x + 3 - 2 + 1 = +1$ Therefore $x = -1$
 oxidation state of N = -1

As $\text{Fe}^{3+} \rightarrow \text{Fe}^{2+}$, and ratio is 2:1

then oxidation state of product goes up by **2 to +1** (1)

(d) Product must be N_2O (1)



Total 8