Max Shi

Q1 $Cr(OH)_4^- \rightarrow CrO_4^{2-}$

(+3 −1 → +6 −2)

$Cr(OH)_4^- \rightarrow CrO_4^{2-} + 4H^+ + 3e^-$

Q2 $VO^{2+} \rightarrow V^{3+}$

(+4 −2)

$2H^+ + VO^{2+} + e^- \rightarrow V^{3+} + H_2O$

Q3 $Ag + NO_3^- \rightarrow Ag^+ + NO_2$

$Ag \rightarrow Ag^+$

$Ag \rightarrow Ag^+ + e^-$

$NO_3^- \rightarrow NO_2$ (+5 −2 → +4 −2)

$2H^+ + NO_3^- + e^- \rightarrow NO_2 + H_2O$

$Ag + 2H^+ + NO_3^- \rightarrow Ag^+ + NO_2 + H_2O$

Q4 $Zn + NO_3^- \Rightarrow NH_3 + Zn(OH)_4^{2-}$

$Zn \rightarrow Zn(OH)_4^{2-}$ (0 → +2 −1)

$NO_3 \rightarrow NH_4$ (+6 −2 → +4 −1)

$4OH^- + Zn \rightarrow Zn(OH)_4^{2-} + 2e^-$

$NO_3 + 2e^- + 10H^+ \rightarrow NH_4 + 3H_2O$

$NO_3 + 2e^- + 7H_2O \rightarrow NH_4 + 10OH^-$

$Zn + NO_3 + 7H_2O \rightarrow NH_4 + Zn(OH)_4^{2-} + 6OH^-$

Q5. $0.150\,M \times 0.03520\,L = 0.00528\,mol\ Na_2S_2O_3$

$0.00528\,mol\ Na_2S_2O_3 \times \frac{1\,mol\ S_2O_3^{2-}}{1\,mol\ Na_2S_2O_3} \times \frac{1\,mol\ I_2}{1\,mol\ S_2O_3^{2-}} \times \frac{253.8\,g\ I_2}{1\,mol\ I_2} = 1.34\,g\ I_2$

Q6. $35\ drops \times \frac{0.05\,mL}{1\,drop} = 1.75\,mL \times \frac{1.05\,g\ solution}{1\,mL\ solution} = 1.8375\,g$ added

$1.8375 + 150.25 = 152.09\,g$ (mass of flask and contents)