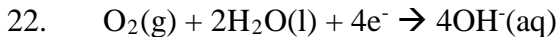
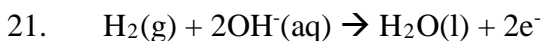


UNIT 5 – THE ESSENTIAL EQUATIONS

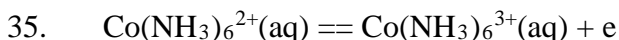
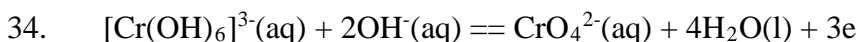
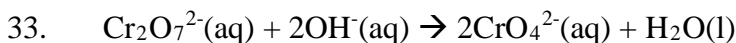
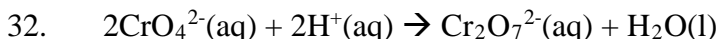
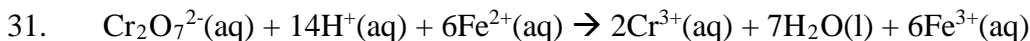
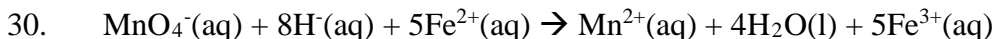
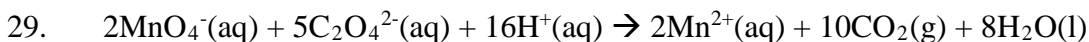
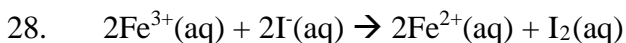
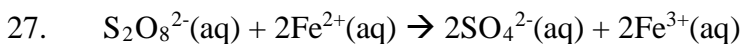
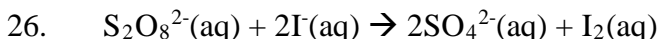
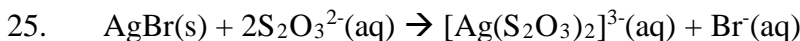
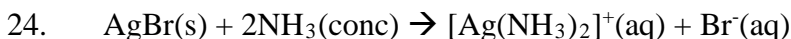
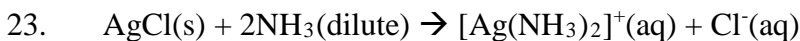
5.2 Periodicity

1. $4\text{Na(s)} + \text{O}_2\text{(g)} \rightarrow \text{Na}_2\text{O(s)}$
2. $2\text{Mg(s)} + \text{O}_2\text{(g)} \rightarrow \text{MgO(s)}$
3. $4\text{Al(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{Al}_2\text{O}_3\text{(s)}$
4. $\text{Si(s)} + \text{O}_2\text{(g)} \rightarrow \text{SiO}_2\text{(s)}$
5. $\text{P}_4\text{(s)} + 5\text{O}_2\text{(g)} \rightarrow \text{P}_4\text{O}_{10}\text{(s)}$
6. $\text{S(s)} + \text{O}_2\text{(g)} \rightarrow \text{SO}_2\text{(g)}$
7. $\text{Na}_2\text{O(s)} + \text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)}$
8. $\text{Na}_2\text{O(s)} + 2\text{H}^+\text{(aq)} \rightarrow 2\text{Na}^+\text{(aq)} + \text{H}_2\text{O(l)}$
9. $\text{MgO(s)} + \text{H}_2\text{O(l)} \rightleftharpoons \text{Mg(OH)}_2\text{(s)} \rightleftharpoons \text{Mg(OH)}_2\text{(aq)}$
10. $\text{MgO(s)} + 2\text{H}^+\text{(aq)} \rightarrow \text{Mg}^{2+}\text{(aq)} + \text{H}_2\text{O(l)}$
11. $\text{Al}_2\text{O}_3\text{(s)} + 6\text{H}^+\text{(aq)} \rightarrow 2\text{Al}^{3+}\text{(aq)} + 3\text{H}_2\text{O(l)}$
12. $\text{Al}_2\text{O}_3\text{(s)} + 3\text{H}_2\text{O(l)} + 6\text{OH}^-\text{(aq)} \rightarrow 2\text{Al(OH)}_6^{3-}\text{(aq)}$
13. $\text{Al}_2\text{O}_3\text{(s)} + 3\text{H}_2\text{O(l)} + 2\text{OH}^-\text{(aq)} \rightarrow 2\text{Al(OH)}_4^-\text{(aq)}$
14. $\text{SiO}_2\text{(s)} + 2\text{OH}^-\text{(aq)} \rightarrow \text{SiO}_3^{2-}\text{(aq)} + \text{H}_2\text{O(l)}$
15. $\text{P}_4\text{O}_{10}\text{(s)} + 6\text{H}_2\text{O(l)} \rightarrow 4\text{H}_3\text{PO}_4\text{(aq)}$
16. $\text{P}_4\text{O}_{10}\text{(s)} + 12\text{OH}^-\text{(aq)} \rightarrow 4\text{PO}_4^{3-}\text{(aq)} + 6\text{H}_2\text{O(l)}$
17. $\text{SO}_2\text{(g)} + \text{H}_2\text{O(l)} \rightleftharpoons \text{H}_2\text{SO}_3\text{(aq)}$
18. $\text{SO}_3\text{(g)} + \text{H}_2\text{O(l)} \rightarrow \text{H}_2\text{SO}_4\text{(aq)}$
19. $\text{SO}_2\text{(g)} + 2\text{OH}^-\text{(aq)} \rightarrow \text{SO}_3^{2-}\text{(aq)} + \text{H}_2\text{O(l)}$
20. $\text{SO}_3\text{(g)} + 2\text{OH}^-\text{(aq)} \rightarrow \text{SO}_4^{2-}\text{(aq)} + \text{H}_2\text{O(l)}$

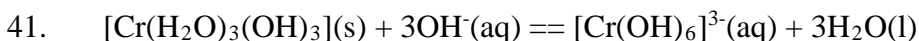
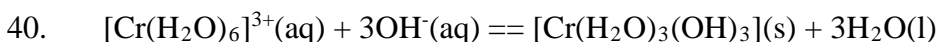
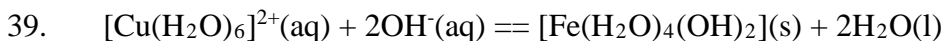
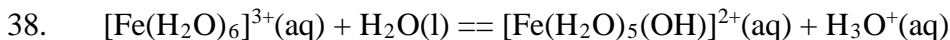
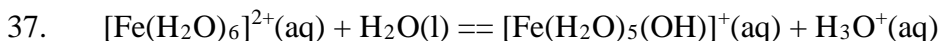
5.3 Redox Equilibria



5.4 Transition Metals



5.5 Reactions of Inorganic Compounds in Solution



42. $[\text{Cr}(\text{H}_2\text{O})_3(\text{OH})_3](\text{s}) + 3\text{H}_3\text{O}^+(\text{aq}) \rightleftharpoons [\text{Cr}(\text{H}_2\text{O})_6]^{3+}(\text{aq}) + 3\text{H}_2\text{O}(\text{l})$
43. $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}(\text{aq}) + 2\text{NH}_3(\text{aq}) \rightleftharpoons [\text{Cu}(\text{H}_2\text{O})_4(\text{OH})_2](\text{s}) + 2\text{NH}_4^+(\text{aq})$
44. $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}(\text{aq}) + 3\text{NH}_3(\text{aq}) \rightleftharpoons [\text{Cr}(\text{H}_2\text{O})_3(\text{OH})_3](\text{s}) + 3\text{NH}_4^+(\text{aq})$
45. $2[\text{Fe}(\text{H}_2\text{O})_6]^{3+}(\text{aq}) + 3\text{CO}_3^{2-}(\text{aq}) \rightarrow 2[\text{Fe}(\text{H}_2\text{O})_3(\text{OH})_3](\text{s}) + 3\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l})$
46. $[\text{Fe}(\text{H}_2\text{O})_6]^{2+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{FeCO}_3(\text{s}) + 6\text{H}_2\text{O}(\text{l})$
47. $[\text{Co}(\text{H}_2\text{O})_4(\text{OH})_2](\text{s}) + 6\text{NH}_3(\text{aq}) \rightleftharpoons [\text{Co}(\text{NH}_3)_6]^{2+}(\text{aq}) + 4\text{H}_2\text{O}(\text{l}) + 2\text{OH}^-(\text{aq})$
48. $[\text{Cu}(\text{H}_2\text{O})_4(\text{OH})_2](\text{s}) + 4\text{NH}_3(\text{aq}) \rightleftharpoons [\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}(\text{aq}) + 2\text{H}_2\text{O}(\text{l}) + 2\text{OH}^-(\text{aq})$
49. $[\text{Cu}(\text{H}_2\text{O})_6]^{2+}(\text{aq}) + 4\text{Cl}^-(\text{aq}) \rightleftharpoons [\text{CuCl}_4]^{2-}(\text{aq}) + 6\text{H}_2\text{O}(\text{l})$