REDOX EQUATIONS

1. Use each of the following pairs of electron-half-equations to work out the ionic equation for the reaction concerned.

   a) The reaction between chlorine gas and bromide ions:

   $$Cl_2 + 2e^- \longrightarrow 2Cl^-$$

   $$2Br^- \longrightarrow Br_2 + 2e^-$$

   b) The reaction between iron(II) ions and acidified potassium manganate(VII) solution:

   $$Fe^{2+} \longrightarrow Fe^{3+} + e^-$$

   $$MnO_4^- + 8H^+ + 5e^- \longrightarrow Mn^{2+} + 4H_2O$$

   c) The reaction between ethanol and acidified potassium dichromate(VI) solution to give ethanal:

   $$CH_3CH_2OH \longrightarrow CH_3CHO + 2H^+ + 2e^-$$

   $$Cr_2O_7^{2-} + 14H^+ + 6e^- \longrightarrow 2Cr^{3+} + 7H_2O$$

   d) The reaction between copper and moderately concentrated nitric acid to give nitrogen monoxide:

   $$Cu \longrightarrow Cu^{2+} + 2e^-$$

   $$NO_3^- + 4H^+ + 3e^- \longrightarrow NO + 2H_2O$$

   e) The reaction between copper and concentrated nitric acid to give nitrogen dioxide:

   $$Cu \longrightarrow Cu^{2+} + 2e^-$$

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

2. Work out electron-half-equations similar to the ones above for:

   a) The oxidation of sulphite ions, SO_3^{2-}, to sulphate ions, SO_4^{2-}.

   b) The reduction of chlorate(V) ions, ClO_3^-, to chlorine gas, Cl_2.

   c) The reduction of manganese(IV) oxide, MnO_2, to manganese(II) ions, Mn^{2+}.

   d) The reduction of xenon(VI) oxide, XeO_3, to xenon gas, Xe.

   e) The oxidation of hydrogen sulphide, H_2S, to sulphur, S.