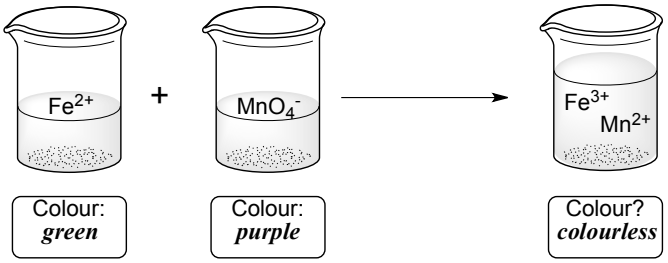
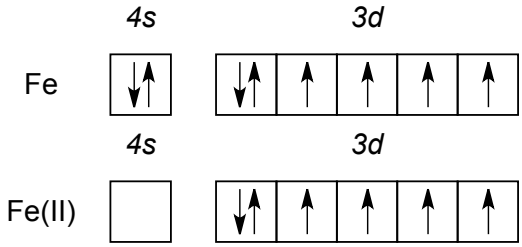
IRON(II) SULFATE AND POTASSIUM PERMANGANATE

In this demonstration, iron(II) sulfate solution is oxidised by potassium permanganate solution to give a solution of iron(III) and manganese(II).

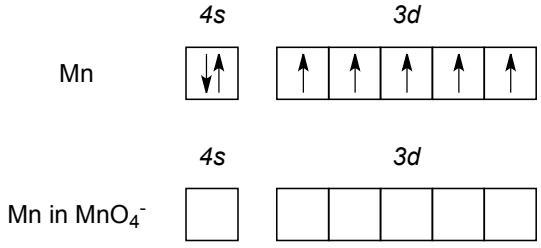


The 4*s* electrons are lost before the 3*d* electrons to form the Period 4 transition metal ions. For example, the electron configurations in atomic iron and in the iron(II) cation are:



1. What is the oxidation number of manganese in MnO_4^- (also known as permanganate)? ***Mn*$^{7+}$**

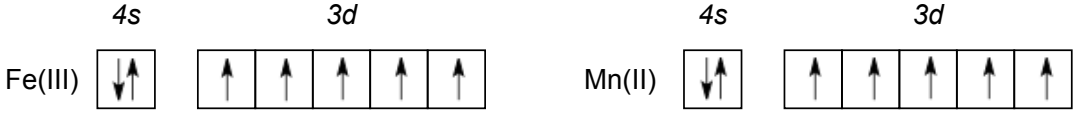
2. The atomic configuration of manganese is below. Fill in the boxes for the configuration of manganese in permanganate?



***Correct as drawn: d*^{0}**

3. In the diagram at the top of the page, note down the colours of the $Fe^{2+}(aq)$ and $MnO_4^-(aq)$ solutions. What colour do you think a mixture of the two solutions will give?

4. Fill in the electron configurations of the resultant $Fe^{2+}(aq)$ and $Mn^{2+}(aq)$ ions below.



Challenge Question

Balance the following redox equation:

$$5\,Fe^{2+}(aq) + MnO_4^-(aq) + 8\,H^+(aq) \longrightarrow 5\,Fe^{3+}(aq) + Mn^{2+}(aq) + 4\,H_2O(l)$$