Exercise 12.2
Colour

1. The $[Fe(CN)_6]^{4-}$ complex is very stable and nontoxic.

(a) What is the oxidation state of iron in this complex?

(b) Write the electron configuration for a neutral iron atom. ***Use the noble gas abbreviation***.

(c) Write the electron configuration for an iron atom with the oxidation state in the above complex. ***Use the noble gas abbreviation***.

(d) Draw two energy level diagrams showing the splitting of the *d* orbitals in this complex, including the correct number of electrons. Draw <u>both</u> possibilities for the distribution of electrons and name them.

(e) Which of the two electron occupancy diagrams drawn in part (d) do you anticipate is correct? Justify your answer.

(f) Would you expect $[Fe(CN)_6]^{4-}$ to be coloured or colourless? Justify your answer.