ELECTROCHEMISTRY (B)

Solutions containing Fe^{3+} can be reduced to Fe^{2+} using zinc.

Half cells for the following redox half equations were connected using a wire and salt bridge under standard conditions. The Fe^{3+}/Fe^{2+} half cell also contained a piece of platinum.

$$Zn^{2+}(aq) + 2e^- \rightleftharpoons Zn(s) \qquad E^\circ = -0.76\ V$$
$$Fe^{3+}(aq) + e^- \rightleftharpoons Fe^{2+}(aq) \qquad E^\circ = +0.77\ V$$

a Write the standard cell notation (cell representation) for this cell.

..... (2)

b Calculate the emf of this cell. ..... (1)

c What was the role of the platinum in the Fe^{3+}/Fe^{2+} half cell .....

.....

..... (1)

d What was the role of the salt bridge in this cell and how does it work? .....

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..... (2)

e Write a balanced equation for the reaction that takes place in this cell.

..... (2)

f The Fe^{3+}/Fe^{2+} half cell contained a mixture of iron(III) sulfate and iron(II) sulfate. Give the concentration of each reagent in the mixture for this to be done under standard conditions.

iron(III) sulfate .....

iron(II) sulfate ..... (2)

g If the concentration of Zn^{2+} ions was changed from 1.0 mol dm^{-3} to 0.5 mol dm^{-3}, how would this affect the emf of the cell. Explain your answer.

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..... (3)