ELECTROCHEMISTRY (A)

1 Half cells for the following redox half equations were connected using a wire and salt bridge.

$Cu^{2+} + 2e^- \rightleftharpoons Cu$ $\quad E° = +0.34$ V

$Fe^{2+} + 2e^- \rightleftharpoons Fe$ $\quad E° = -0.41$ V

a Write the standard cell notation (cell representation) for this cell. **Fe(s) | Fe^{2+}(aq) | | Cu^{2+}(aq) | Cu(s)**

b Calculate the emf of this cell. **+0.75 V**

c Write a balanced equation for the reaction that takes place in this cell. **Cu^{2+} + Fe → Cu + Fe^{2+}**

d State three essential conditions in order for this cell to operate under standard conditions.

1 **298K**

2 **1.0 mol dm^{-3} Cu^{2+}**

3 **1.0 mol dm^{-3} Fe^{2+}**

2 The electrode potential of the Zn^{2+}/Zn half cell was measured against the standard hydrogen electrode (SHE). In this cell, the SHE was placed on the left, and an emf of –0.76 V was recorded.

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

Pt(s) | H_2(g) | H^+(aq) | | Zn^{2+}(aq) | Zn(s)

b Calculate the electrode potential of the Zn^{2+}/Zn half cell. **–0.76 V**

c Write a balanced equation for the reaction that takes place in this cell. **Zn + $2H^+$ → Zn^{2+} + H_2**

d What is the role of the platinum in the SHE? **to provide a surface for electron transfer**