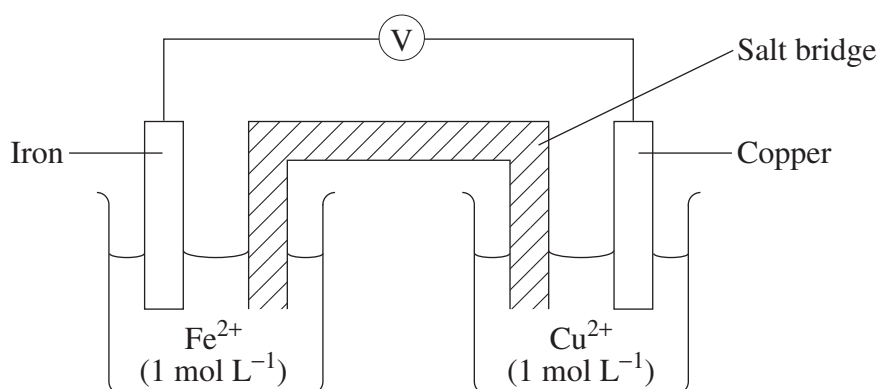


**Question 29 — Shipwrecks and Salvage (25 marks)**

- (a) (i) Name the type of electrochemical cell that produces a spontaneous reaction. **1**
- (ii) Calculate the voltage required to operate the cell shown in the diagram as an electrolytic cell, showing relevant half-equations in your working. **3**



- (b) Describe how the work of early scientists increased our understanding of electron transfer reactions. **4**
- (c) (i) Name ONE method for removing salt from an artefact recovered from a wreck. **1**
- (ii) Explain, using an example, chemical procedures used to clean and preserve artefacts from wrecks. **4**
- (d) During your practical work you performed a first-hand investigation to compare and describe the rate of corrosion of materials in different acidic and neutral solutions.
- (i) Outline the procedure used. **2**
- (ii) It is hypothesised that acidic environments accelerate the corrosion of shipwrecks. **4**
- Explain how data obtained from the procedure in part (d) (i) does or does not support this hypothesis.
- (e) Analyse the effect of ocean depth on corrosion of metallic objects. **6**