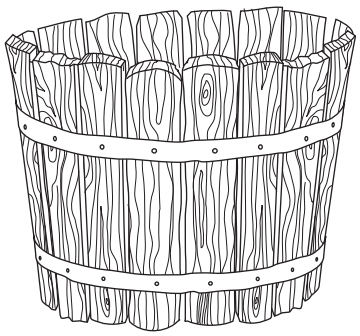
Question 33 — Shipwrecks, Corrosion and Conservation (25 marks)

Answer parts (a)–(c) in a writing booklet.

(a) The following artefact was retrieved from a ship that sank 150 years ago off the coast of New South Wales. **3**



Outline the effect that the marine environment would have had on the artefact.

(b) (i) Use a fully labelled diagram to show the electrolysis of an aqueous solution of potassium chloride. Write the relevant half equations and the overall reaction for the cell. **4**

(ii) How would the cathode be identified? **1**

(c) The following table shows the composition of four types of steel. **5**

Steel	*Composition*
1	99.8% Fe, 0.2% C
2	98.5% Fe, 1.5% C
3	94% Fe, 4% C, 1% Mn, 1% Si
4	75% Fe, 15% Cr, 10% Ni

Explain how the composition of each type of steel determines its properties and uses.

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Question 33 (continued)

Answer parts (d)–(e) in a SEPARATE writing booklet.

(d) (i) An investigation into environmental factors that affect the rate of corrosion of iron can be performed in a school laboratory. **4**

Describe how you could perform this investigation in relation to THREE environmental factors.

(ii) Explain how the effect of ONE of the factors could be reduced in a marine environment. **1**

(e) Evaluate the suitability of techniques used for restoring and conserving wooden and copper artefacts that have been immersed in salt water for at least 100 years. **7**

End of Question 33