METAL REACTIVITY (B)

1 Sodium is extracted by the electrolysis of molten sodium chloride.

a Write a half equation for the conversion of sodium ions to sodium atoms in this process.

$Na^+ + e^- \rightarrow Na$

b Explain whether the production of sodium in this method is an oxidation or reduction process.

reduction as sodium ions gain electrons

2 Chromium can be extracted from chromium(III) oxide (Cr_2O_3) in a displacement reaction with aluminium.

$$Cr_2O_3 + 2Al \rightarrow 2Cr + Al_2O_3$$

a Write a half equation for the conversion of chromium ions to chromium atoms in this process.

$Cr^{3+} + 3e^- \rightarrow Cr$

b Write a half equation for the conversion of aluminium atoms to aluminium ions in this process.

$Al - 3e^- \rightarrow Al^{3+}$

c Write an ionic equation for this process.

$Cr^{3+} + Al \rightarrow Cr + Al$

d Explain, in terms of electrons, why aluminium is more reactive than chromium.

aluminium atoms lose electrons more easily than chromium atoms

e Explain, in terms of electrons, why this is a redox reaction.

both reduction & oxidation take place
aluminium atoms lose electrons = oxidation
chromium ions gain electrons = reduction