2024 Higher Chemistry Paper 1 – Q13

Section: Nature’s Chemistry
Topic: Esters and Reactions of Carboxylic Acids

Question summary (Q13):
What type of reaction takes place when propan-1-ol is formed from propanoic acid?

Worked Solution:
• Propanoic acid has the functional group –COOH.
• Converting it to propan-1-ol means replacing the –COOH with a –CH_2OH group.
• This involves the gain of hydrogen atoms (or equivalently, removal of oxygen).
• Gaining hydrogen/removing oxygen = reduction.

Final Answer: D — Reduction

Revision Tips:
• Oxidation: add O / remove H.
• Reduction: add H / remove O.
• Carboxylic acids can be reduced to primary alcohols using reducing agents (e.g. $LiAlH_4$ in lab practice).
• Always match the change in functional group to the definition of oxidation vs reduction.