2024 Higher Chemistry Paper 1 – Q14

Section: Nature’s Chemistry
Topic: Systematic Carbon Chemistry (Alkanes)

Question summary (Q14):
The boiling points of the alkanes increase as the carbon chain length increases due to the increasing strength of which interaction?

Worked Solution:
• Alkanes are non-polar molecules.
• The only intermolecular forces present are London dispersion forces (induced dipole–induced dipole interactions).
• As chain length increases, there are more electrons and a larger surface area for temporary dipoles → stronger dispersion forces.
• Stronger dispersion forces → higher boiling points.

Final Answer: C — London dispersion forces

Revision Tips:
• Non-polar molecules (like alkanes) only have London dispersion forces.
• Polar molecules can also have permanent dipole–dipole interactions, or hydrogen bonding if –OH or –NH present.
• Trend: more carbons → more electrons → stronger dispersion forces → higher boiling points.