3 Chemical bonding – Part 2 — Answers

Answers

Work through these after trying the questions yourself.

3.1 The electron pairs repel and push as far apart as possible.
3.2 (a) tetrahedral, 109.5° \ (b) linear, 180°.
3.3 NH_3 has a lone pair, which pushes harder than a bonding pair, so it squeezes the bond angle below the 109.5° of CH_4 (to 107°).
3.4 A separation of charge in a bond/molecule — one end slightly positive ($\delta+$), the other slightly negative ($\delta-$).
3.5 More electrons give stronger London forces, so more energy is needed to separate the molecules — the boiling point rises.
3.6 Nitrogen, oxygen and fluorine (N, O, F).

3.7 In water, H is bonded to O, so the molecules are held together by strong hydrogen bonds. H_2S has no H bonded to N, O or F, so it has only weaker van der Waals' and dipole forces. More energy is needed to separate water molecules, so water boils at a much higher temperature.