Solutions

Each answer shows the steps, then the **result**.

2.1

(a)

- giant molecular (giant covalent)

(b)

- giant metallic

2.2

- only weak intermolecular forces are broken on melting

2.3

- **simple molecular** (a molecular lattice of I_2 molecules)

2.4

- layers of metal ions can slide over each other while the delocalised electrons keep holding them together

3.1 C

- Giant metallic conducts when solid (delocalised electrons)

3.2 B

- Graphite has delocalised electrons between its layers

3.3

(a)

- giant molecular (giant covalent) structure with covalent bonding

(b)

- e.g. diamond / silicon(IV) oxide

3.4

- when molten or dissolved the ions are free to move and carry charge; in the solid the ions are fixed in the lattice, so they cannot move

3.5

- magnesium forms Mg^{2+} ions, with a higher charge (and smaller radius) than Na^{+}
- magnesium gives two delocalised electrons per atom, sodium only one
- so the metallic bonding (attraction between ions and delocalised electrons) is stronger and needs more energy to overcome

3.6

- SiO_2 is giant covalent (giant molecular): every atom is held by strong covalent bonds
- melting it means breaking many strong covalent bonds, which needs a lot of energy
- CO_2 is simple molecular: only weak intermolecular forces between molecules are overcome, which needs little energy