

**Structure and bonding explanation Answers**

Substance	Reasons for properties
Carbon (diamond)	The high melting point, extreme hardness and high density are due to its giant molecular structure.
Propanone	The relatively low melting point, boiling point, hardness and density are due to its simple molecular structure.
Iodine	The relatively low melting point, boiling point, hardness and density are due to its simple molecular structure. The melting point indicates that it is a solid at room temperature due to its high molecular mass and increased induced dipole-induced dipole bonds.
Iron	Its high melting point, boiling point, density and hardness are due to its giant lattice structure. Its electrical conductivity is due to the delocalised electrons.
Water	The relatively low melting point, boiling point, hardness and density are due to its simple molecular structure. The relatively high boiling point compared with molecular mass is due to hydrogen bonds.
Polyethene	The low melting point, melting over a range, suggests a polymer. This is consistent with a low hardness and density just less than that of water.
Sodium chloride	The high melting point and boiling point suggests a giant lattice. Its structure contains ions which are able to move in the molten substance and therefore conduct electricity.
Silicon(IV) oxide	A high melting point and boiling point indicate a giant lattice. The inability to conduct electricity suggests a giant covalent molecule.
Benzene	Its relatively low melting point, boiling point, hardness and density are due to a simple molecular structure.
Methane	The very low melting point and boiling point indicate a simple molecular structure and a substance that is a gas at room temperature due to its limited instantaneous dipole - induced dipole bonds.