

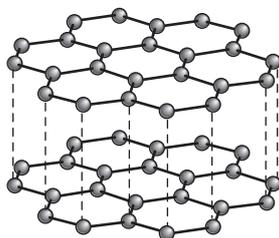
Worksheet 3.5

Bonding and crystal structure

1 Match each of the following substances to the type of structure it has by drawing a line between the boxes.

Substance	Structure
graphite	giant metallic
magnesium oxide	giant molecular
iodine	giant molecular
brass	giant molecular
diamond	giant ionic
silicon dioxide	simple molecular

2 a i What substance does this structural diagram represent?



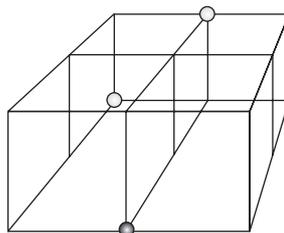
ii This structure gives the substance some very distinctive properties. Give two of these properties.

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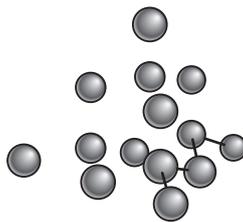
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b Complete the magnesium oxide lattice by adding further ions to complete the diagram of the lattice.

- for an oxide ion and
- for a magnesium ion



c Complete the diamond structure by adding lines to show the covalent bonds between the carbon atoms.



3 Complete the table below by stating:

- a the elements present in the compound
- b the bonding in the compound.

The first one has been completed for you.

Compound	Type of elements	Type of bonding
sodium chloride (NaCl)	sodium metal chlorine non-metal	ionic
ammonia (NH ₃)		
calcium oxide (CaO)		
methane (CH ₄)		
magnesium nitride (Mg ₃ N ₂)		

4 Copy and complete these sentences using the words below to fill the gaps.

covalent giant high low molecules strong weak

Although bonds are very strong, the forces between simple covalent molecules are Because of this, substances with small, such as methane or ammonia, have very melting and boiling points.

Some covalent materials, such as diamond or silicon dioxide, form structures.

Because every bond in these materials is a covalent bond, they are hard solids with melting and boiling points.