

## Questions on Structure and Bonding

- 1 Draw a diagram showing the arrangement of the **outer shell** electrons in one molecule of hydrogen bromide (HBr). [2]

- 2 State the type of structure and bonding for each of the following by putting ticks in boxes: [8]

SUBSTANCE	IONIC	COVALENT	SIMPLE MOLECULAR	GIANT
Magnesium chloride				
Water				
Ammonia				
Calcium oxide				
Sulfur dioxide				
Diamond				
Graphite				
C <sub>60</sub> fullerene				

- 3 Finish the following sentences:

(a) Ionic compounds have a high melting point because... [3]

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(b) Covalent substances with a simple molecular structure have low boiling points because... [3]

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- 4 Explain why the following statements are **false**

(a) *Oxygen has a higher boiling point (-183 °C) than hydrogen (-253 °C) because there is a double bond between the oxygen atoms but only a single bond between the hydrogen atoms.* [3]

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(b) *Sodium chloride has a higher melting point (801 °C) than carbon tetrachloride (CCl<sub>4</sub>, -23 °C) because ionic bonds are stronger than covalent bonds.* [3]

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5 The boiling points of the halogens are shown in the table:

	Boiling point / °C
Fluorine, F <sub>2</sub>	-188
Chlorine, Cl <sub>2</sub>	-34
Bromine, Br <sub>2</sub>	59
Iodine, I <sub>2</sub>	184

Explain whether the following is true or false.

*The boiling point increases down the group therefore it can be deduced that the strength of the covalent bond between two F atoms is weaker than that between two I atoms.* [3]

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6 Explain why magnesium oxide, MgO, has a very high melting point but carbon dioxide, CO<sub>2</sub>, has a very low melting point. [3]

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7 Explain why MgO does not conduct electricity when solid but does conduct when molten. [2]

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8 Explain in terms of their structures why the melting point of diamond is much higher than that of chlorine. [3]

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9 The elements helium, neon and argon are all found in Group 0 of the Periodic Table. [2]

(a) What is the most important characteristic of the chemical properties of these elements?

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(b) Explain the property in (a) in terms of electrons.

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