Bonding and Structure and properties of materials

Question 1 M/J 04 P1 Q10

What happens when sodium chloride melts?

A Covalent bonds in a giant lattice are broken.

B Electrons are released from atoms.

C Electrostatic forces of attraction between ions are overcome.

D Molecules are separated into ions.

Question 2 O/N 04 P2 Q2

substance	*type of bonding*	*melting point / °C*	*boiling point / °C*
iodine	covalent	114	184
lead(II) bromide	ionic	370	914
methane	covalent	–182	–161
bromine	covalent	–7	59
silicon dioxide	covalent	1610	2230
lithium	metallic	180	1360

Use the substances named in the table to answer the following questions.

(a) Name the substances that are not solids at room temperature and pressure.

..... [1]

(b) Which substance is a liquid over the largest temperature range?

..... [1]

(c) Name the substances that are non-metallic elements.

..... [1]

(d) Which two substances conduct electricity when molten?

..... [1]

(e) Explain, using ideas about structure, why methane and silicon dioxide have different melting points.

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..... [2]

(f) Describe a method for making lead from lead(II) bromide.

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..... [2]

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Question 3 O/N 04 P1 Q3

A liquid boils at a temperature of 100 °C.

Which other property of the liquid proves that it is pure water?

A It does not leave a residue when boiled.

B It freezes at 0 °C.

C It is neither acidic nor alkaline.

D It turns white anhydrous copper(II) sulphate blue.

Question 4 O/N 04 P1 Q10

Which compound has both ionic and covalent bonds?

A ammonium chloride

B carbon dioxide

C ethyl ethanoate

D sodium chloride

Question 5 O/N 05 P1 Q8

Which **two** statements about a covalent bond are correct?

1 It can be formed between two metal atoms.

2 It can be formed between two non-metal atoms.

3 It is formed by the transfer of electrons between atoms.

4 It is formed by sharing electrons between atoms.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

Question 6 O/N 05 P1 Q9

Which statement explains why sodium chloride, NaC*l*, has a lower melting point than magnesium oxide, MgO?

A Sodium chloride is covalent but magnesium oxide is ionic.

B Sodium is more reactive than magnesium.

C The attraction between Na^+ and Cl^- is weaker than that between Mg^{2+} and O^{2-}.

D The melting point of sodium is lower than that of magnesium.

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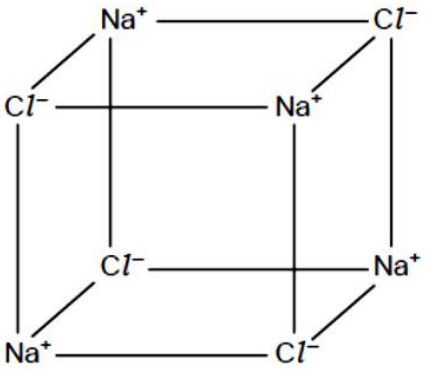
Question 7 M/J 05 P2 Q6

The structure of sodium chloride is drawn below.



(a) Sodium chloride is an ionic solid.
Draw the electronic structure of both a sodium ion and a chloride ion.

sodium ion chloride ion

[2]

(b) Sodium chloride has a melting point of about 800 °C.

(i) Explain why sodium chloride has a high melting point.

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(ii) Magnesium oxide, MgO, has a similar structure to sodium chloride. Suggest why the melting point of magnesium oxide is higher than that of sodium chloride.

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[3]

(c) Explain why solid sodium chloride will not conduct electricity but molten sodium chloride will.

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.....[1]