

Q4. Some properties of the Group IV elements are shown in the table.

element	melting point /°C	relative electrical conductivity
carbon (diamond)	3550	non-conductor
silicon	1410	poor conductor
germanium	937	poor conductor
tin	232	conductor
lead	328	conductor

(a) (i) Explain in terms of structure and bonding why diamond has such a high melting point.

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 [2]

(ii) Use the information in the table to suggest how the type of structure and bonding in carbon (diamond) differs from the type of structure and bonding in tin. Explain your answer.

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 [2]

(iii) Lead oxide is an amphoteric oxide.

What is the meaning of the term *amphoteric oxide*?

..... [1]

(b) Explain why farmers spread nitrogen-containing fertilisers on their fields.

..... [1]

(c) Describe a test for ammonia.

test

result

[2]

(d) Explain why adding calcium hydroxide to the soil at the same time as ammonium phosphate results in loss of nitrogen from the soil.

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..... [2]