Bonding, structure and properties

Chemistry Paper 1 | 5 questions, 6 marks each

GCSE science 6-mark questions

This topic online

Name: _____ **Date:** _____ **Score:** _____ **/ 30**

Plan before you write: jot down the 6 or more ideas you need, then put them in a sensible order. For compare questions give both sides of each point; for evaluate questions use the information and finish with a conclusion.

1 Magnesium burns in oxygen to form magnesium oxide, MgO. Magnesium has the electronic structure 2,8,2 and oxygen has the electronic structure 2,6.

Describe how magnesium and oxygen atoms form magnesium oxide, and describe the structure of the compound formed.

(6 marks)

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2 Diamond and graphite are both made only of carbon atoms. Diamond is used on the tips of drill bits. Graphite is used in pencils and as electrodes.

Compare the structures of diamond and graphite and use them to explain the differences in their properties.

(6 marks)

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3 A technician has four unlabelled solids, W, X, Y and Z. She tests each one.

Solid	Melting point in °C	Conducts as a solid?	Conducts when melted or dissolved?	Soluble in water?
W	770	no	yes	yes
X	-23	no	no	no
Y	1084	yes	yes (when melted)	no
Z	1700	no	no	no

Use the data to identify the type of structure in each solid. Explain your choices. (6 marks)

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4 A kitchenware company sells plastic chopping boards with silver nanoparticles mixed into the surface. It claims the boards stay cleaner because the silver kills bacteria from raw meat.

Information:

- Silver nanoparticles are 1 to 100 nm across.
- A smaller mass of silver nanoparticles kills the same number of bacteria as a larger piece of normal silver.
- In a test, about 30% of the silver had worn away from the surface after a year of daily scrubbing.
- Silver washed down the sink can reach rivers, where it may harm useful bacteria.
- Scientists are still studying whether nanoparticles that rub off onto food can be absorbed by the body.

Evaluate the use of silver nanoparticles in chopping boards.

Separate science only

(6 marks)

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5 **Higher tier**

In the simple particle model, the particles in a substance are drawn as small solid spheres.

Sodium chloride melts at 801 °C. Oxygen melts at -218 °C.

Use ideas about particles and forces to explain the difference in melting points. Then explain the limitations of the simple particle model.

(6 marks)

End of questions | Total 30 marks

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