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ANSWERS 102

Diamond, graphite and graphene

1 **Figure 1 shows three giant covalent substances. Choose the correct letter to answer each question.** (2 marks, ★★)

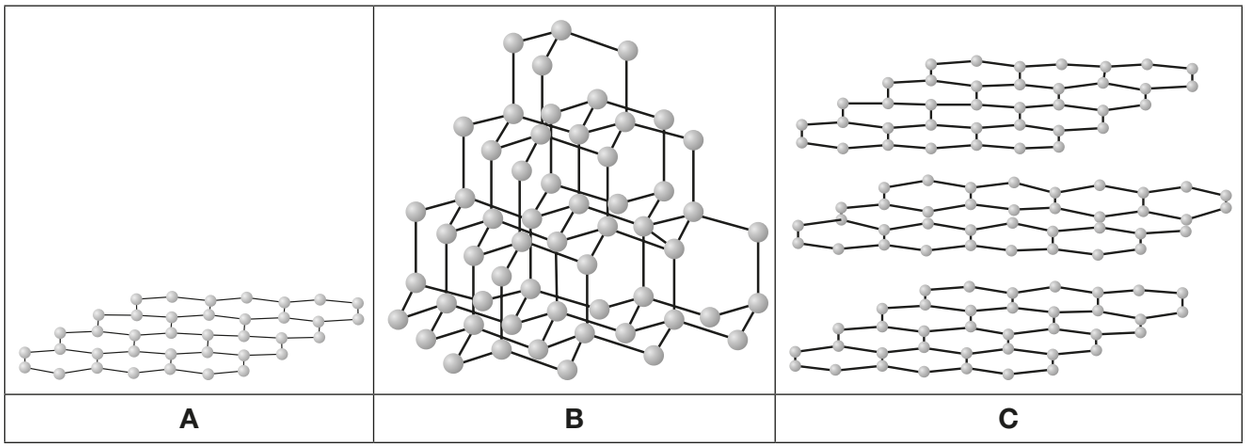


Figure 1

a **Which substance is graphene?** .....

b **Which substance has weak intermolecular forces?** .....

NAILIT!

The properties of diamond and graphite are often assessed in exams.

2 **This question is about the properties of diamond and graphite.**

a **Use your knowledge about their structure and bonding to explain why diamond and graphite both have high melting points.** (2 marks, ★★★)

.....

.....

b **Explain why diamond is hard.** (2 marks, ★★★)

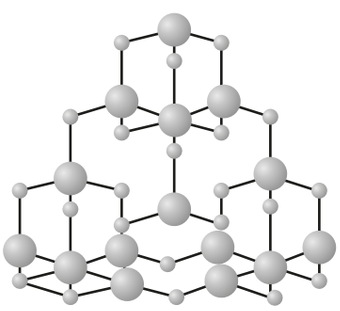
.....

.....

c **Although graphite is a non-metal, like metals it conducts electricity. Explain what feature both graphite and metals have that enable them to conduct electricity.** (1 mark, ★★★)

.....

3 **Silicon dioxide, SiO_2, is the main component of sand. It has a giant covalent structure, shown below.**



a **SiO_2 does *not* conduct electricity. Suggest why.** (1 mark, ★★★)

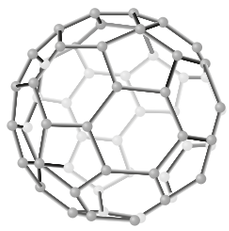
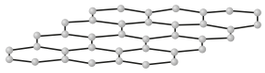
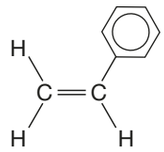
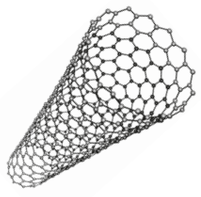
.....

b **Predict two further properties of SiO_2.** (2 marks, ★★★)

.....

Fullerenes and polymers

1 **The diagram below shows three different substances made from carbon. Choose the correct letter to answer each question.** (4 marks, ★★)

			
A	**B**	**C**	**D**

a **Which substance has a very high length to diameter ratio?** .....

b **Which substance could be used to make a polymer?** .....

c **Which substance is buckminster fullerene?** .....

d **Which substance is made from a single layer of graphite?** .....

2 **The structures of fullerenes and nanotubes are unique, which gives them many uses. Explain how their structure makes them suitable for the following:**

a **Fullerenes can be used to deliver drugs to targeted areas inside the body.** (1 mark, ★★★)

.....

b **Nanotubes make excellent catalysts.** (1 mark, ★★★)

.....

3 **Polyethene is a polymer made from many ethene molecules joined together in a long chain.**

a **Which type of bonds are found in polymers?** (1 mark, ★)

.....

The table below shows some of the properties of ethene and polyethene.

	Ethene	Polyethene
Melting point/°C	–169	Approx. 120
Size of molecules	Small	Large
State at room temperature	Gas	Solid

b **Use this information to explain why ethene is a gas at room temperature yet polyethene is a solid.** (3 marks, ★★★)

.....

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