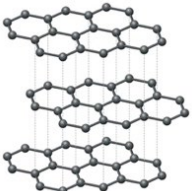
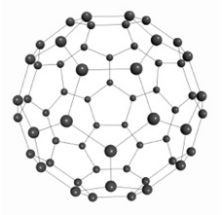
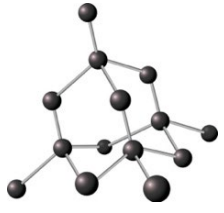
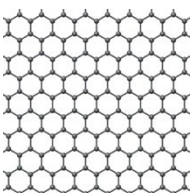
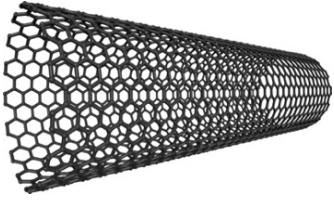


Structure and bonding of carbon

1 (a) Name these different forms of carbon.

A		
B		
C		
D		
E		

All images in the table: source © Shutterstock

(5 marks)

- (b) In which of the forms of carbon in **question 1(a)** does each carbon atom form four single covalent bonds?

_____ (1 mark)

- (c) In the other forms of carbon, each atom forms three single covalent bonds. What happens to the single unpaired electron?

_____ (1 mark)

- (d) Name the type of structure in:

i. diamond

_____ (1 mark)

ii. graphite

_____ (1 mark)

iii. Buckminsterfullerene

_____ (1 mark)

- 2** Buckminsterfullerene was the first fullerene to be discovered.

- (a) State the formula of a molecule of Buckminsterfullerene.

_____ (1 mark)

- (b) Look at the diagram of Buckminsterfullerene in **question 1** (check your answer first), and then use the words below to describe the structure of a molecule of Buckminsterfullerene.

hexagons pentagons covalent spherical hollow

(5 marks)

Buckminsterfullerene was discovered in 1985. Scientists predicted many uses for this fullerene.

- (c) Suggest why Buckminsterfullerene could be used to deliver drugs to specific parts of the body.

_____. (1 mark)

- (d) Suggest why Buckminsterfullerene could be used in lubricants.

_____. (1 mark)

- 3 The table shows the approximate melting points of some forms of carbon:

Form of carbon	Melting point/°C
diamond	3600
graphite	3600
Buckminsterfullerene (a fullerene)	600

- (a) Explain why the melting points of diamond and graphite are higher than the melting point of the Buckminsterfullerene.

(6 marks)

- (b) The Mohs scale is used to measure the hardness of substances. Diamond has a hardness of 10. Graphite has a hardness of 2. Explain why diamond is harder than graphite.

(4 marks)

- (c) Name the common feature that enables both metallic elements and graphite to conduct electricity.

(1 mark)

- 4 (a) The table lists some properties of graphene. Complete the table to explain how the structure of graphene explains the property.

Property of graphene	How the structure explains the property
High strength	
Low weight	
Transparent	
Good conductor of heat and electricity	

(4 marks)

- (b) Explain why some scientists describe graphene as a 2D substance and graphite as a 3D substance.

(2 marks)

[Total: 35 marks]



Which question(s) did you get wrong? Why?

What will you do next time you're asked a similar question?