

Structure and bonding of carbon

- 1 The diagrams in the table show different structures of carbon. Choose from the words provided to match the structures to their correct name.

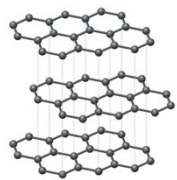
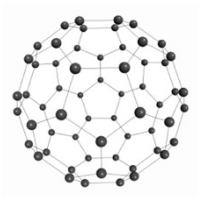
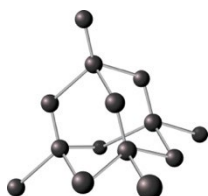
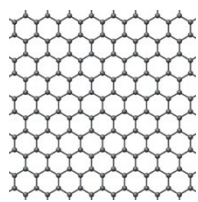
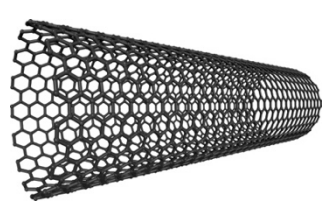
nanotube

diamond

graphene

fullerene

graphite

A		
B		
C		
D		
E		

All images in the table: source © Shutterstock

(5 marks)

- 2 (a) State how many single covalent bonds a carbon atom can form.

_____ (1 mark)

- (b) Complete the table by filling in the number of single covalent bonds formed by each carbon atom for the following substances.

Substance	Number of single covalent bonds formed by each carbon atom
diamond	
graphite	
graphene	
fullerenes	

(4 marks)

- (c) Choose words from those provided to describe the structure of each of the substances. You do not have to use all the words and some words may be used more than once.

giant ionic structure

giant covalent structure

molecular

metallic structure

- i. diamond

- ii. graphite

- iii. fullerenes

(3 marks)

- 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) State which type of bonds are broken when diamond and graphite melt.

_____ (1 mark)

- (b) State the force that is overcome when Buckminsterfullerene melts.

_____ (1 mark)

- (c) State which form of carbon needs the least energy to melt.

_____ (1 mark)

- 4 This question is about diamond, graphite and graphene. Refer to the structure of each as you answer the questions by looking at **question 1**. (First check that your answers to **question 1** are correct.)

- (a) Describe two ways that the structure of diamond is different to the structure of graphite.

_____ (2 marks)

- (b) Graphite conducts electricity. Which particles carry the charge when graphite conducts?

_____ (1 mark)

- (c) Graphite is used as pencil 'leads' and in lubricants. Explain why it is suitable for these uses.

_____ (2 marks)

This question is about fullerenes. The first fullerene to be discovered was the Buckminsterfullerene.

- (d) What is the correct formula for a molecule of Buckminsterfullerene?
Circle the correct answer.

(1 mark)

A. C60

B. C⁶⁰

C. ₆₀C

D. C₆₀

- (e) Describe the shape of the Buckminsterfullerene.

(1 mark)

- (f) Suggest why fullerenes can be used to deliver drugs to a specific part of the body.

(2 marks)

[Total: 25 marks]



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

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