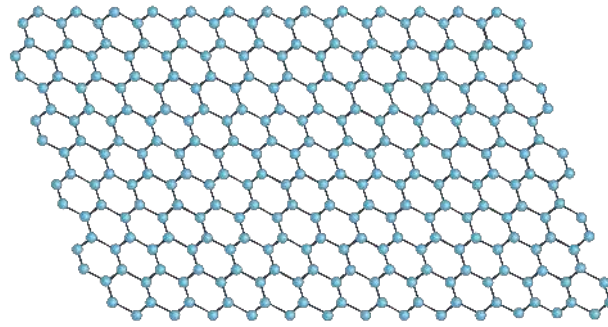


0 1

The diagram shows the structure of a material called graphene. It is made of a single layer of carbon atoms.



0 1

1

Use your knowledge of carbon structures to explain why graphene can conduct electricity. [3 marks]

There are delocalised or free electrons [1 mark]

There is one free electron per atom [1 mark]

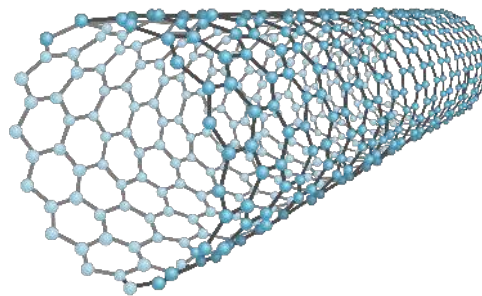
The free electrons can carry charge or current [1 mark]

TOP TIP : You can say that there are three electrons per atom used in bonding or one electron per atom is not used in bonding.

0 2

The diagram shows the structure of a nanotube. Nanotubes are made of hexagonal rings of carbon atoms.

WARNING : Don't get this confused with the metallic bond or ionic compounds. It mentions carbon atoms and so you know that there are going to be covalent bonds between carbon atoms.



Nanotubes are very strong and so could be used to make objects like tennis rackets.

0 2

1

Explain why nanotubes are strong. [3 marks]

Because graphene has a giant or lattice structure [1 mark]

Graphene has a covalent structure or covalent bonds between the atoms [1 mark]

The covalent bonds are very strong [1 mark]

A lot of energy is required to break the covalent bonds [1 mark]

(Total 6 marks)

End