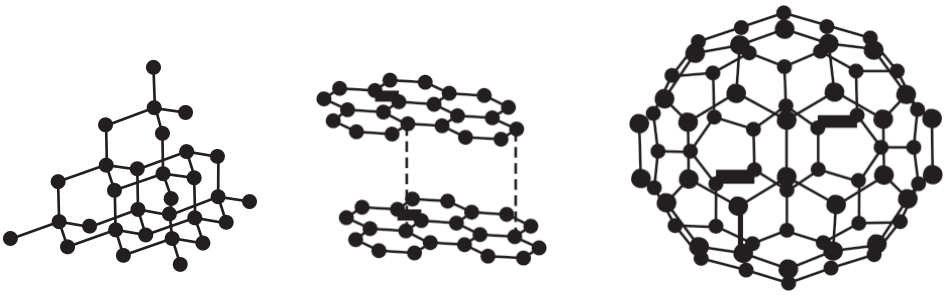
GCSE Chemistry A (Gateway Science)

J248/01 Chemistry A C1-C3 and C7 (Foundation Tier)

Question Set 29

1 The diagrams show three different structures of carbon.

● = carbon atom



Diamond Graphite Structure **Y**

(a) (i) What is the name of structure **Y**? fullerenes **[1]**

(ii) Diamond can be described as having a **giant lattice** structure.

Why is diamond described as a giant lattice structure? **[2]**

As diamond consists of each carbon atom joined to 4 other carbon atom by strong covalent bonds forming a regular tetrahedral lattice structure.

(b) (i) Diamond is the hardest naturally occurring substance on Earth.

Explain why diamond is hard. **[2]**

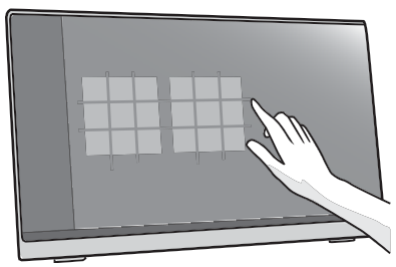
Because diamond is formed by strong covalent bonds in rigid tetrahedral crystalline structure.

(ii) Graphite is used in pencils. Graphite is a soft material.

Explain why graphite is soft. **[1]**

Because graphite has layered structure with weak Van der Waals forces between the layers. The layers can easily slide over each other.

(c) Graphene is another substance made of carbon atoms. Graphene is a single layer of graphite. It is just one atom thick. Graphene can be used to make touchscreens for electronic devices.



Look at the table. It shows some properties of graphite and graphene.

Substance	Cost	Electrical conductivity	Density	Strength	Colour
Graphite	low	high	low	low	black
Graphene	high	high	low	high	transparent

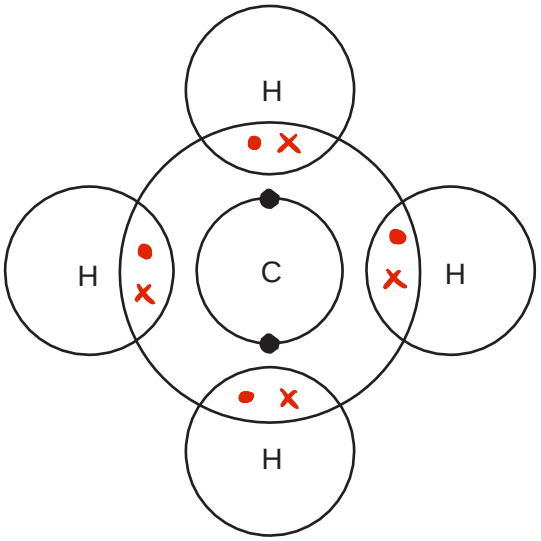
Explain why **graphene** is suitable for making touchscreens.

Use the information from the table. **[2]**

Because it is strong (to reduce the chance of damage) and it is transparent (so that we can see what we are pressing on the screen)

(d) (i) Carbon reacts with hydrogen to make methane, CH_4.

Complete the dot and cross diagram to show the bonding in methane.



[2]

(ii) Methane has a low melting point.

Explain why methane has a low melting point.

Use ideas about structure and bonding in your answer. **[2]**

Because between methane molecules there are very weak intermolecular forces which can be easily overcomed with relatively small amount of energy.

Total Marks for Question Set 29: 12