

1 Diamond and graphite are macromolecules.

Which statement about diamond and graphite is **not** correct?

- A** They are giant structures with high melting points.
- B** They are non-conductors of electricity.
- C** They contain only atoms of a non-metal.
- D** They have covalent bonds between the atoms.

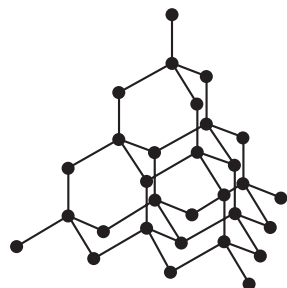
2 Two statements about diamond are given.

- 1 Diamond has a giant three-dimensional covalent structure of carbon atoms.
- 2 Diamond is one of the hardest substances known.

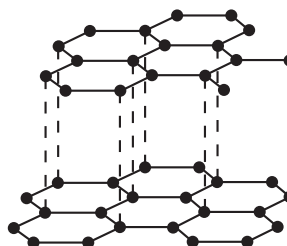
Which is correct?

- A** Both statements are correct and statement 1 explains statement 2.
- B** Both statements are correct but statement 2 does not explain statement 1.
- C** Statement 1 is correct but statement 2 is incorrect.
- D** Statement 2 is correct but statement 1 is incorrect.

- 3 The structures of diamond and graphite are shown.



diamond



graphite

Which statement about diamond and graphite is **not** correct?

- A** Diamond is used in cutting tools because the strong covalent bonds make it very hard.
  - B** Graphite acts a lubricant because of the weak bonds between the layers.
  - C** Graphite conducts electricity because the electrons between the layers are free to move.
  - D** Graphite has a low melting point because of the weak bonds between the layers.
- 4 Rescuers are drilling through fallen rock in order to rescue some men trapped in a cave. The drill needs lubricating from time to time.

The following statements were made about the materials used for the drill tip and the lubricant and the reasons for their use.

- 1 Diamond was used for the drill tip as it does not conduct electricity.
- 2 Diamond was used for the drill tip as it is very hard.
- 3 Graphite was used as the lubricant as it conducts electricity.
- 4 Graphite was used as the lubricant as it is soft and flaky.

Which statements are correct?

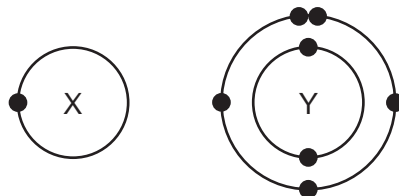
- A** 1 and 3      **B** 1 and 4      **C** 2 and 3      **D** 2 and 4

5 Graphite is a form of carbon.

Why can graphite be used as a lubricant?

- A Graphite contains delocalised electrons which move throughout the structure.
- B Graphite contains weak covalent bonds so the atoms move easily.
- C Graphite has a low melting point so it easily turns into a liquid.
- D Graphite has weak forces of attraction between layers so they can move.

6 The electronic structures of atoms X and Y are shown.



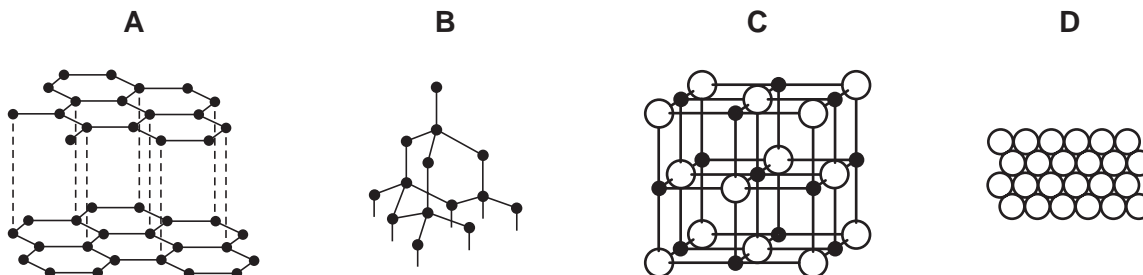
X and Y form a covalent compound.

What is its formula?

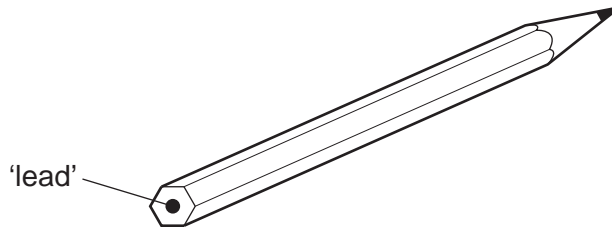
- A  $XY_5$
- B  $XY_3$
- C XY
- D  $X_3Y$

7 Slate has a layered structure and can easily be split into thin sheets.

Which diagram shows a structure most like that of slate?



- 8 The 'lead' in a pencil is made of a mixture of graphite and clay.



When the percentage of graphite is increased, the pencil slides across the paper more easily.

Which statement explains this observation?

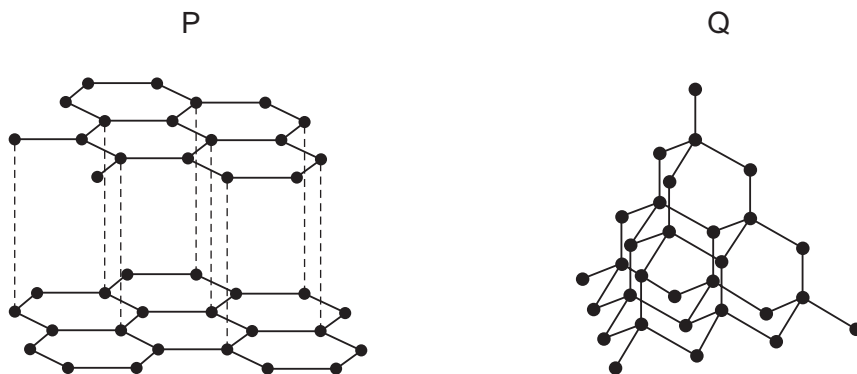
- A Graphite has a high melting point.
  - B Graphite is a form of carbon.
  - C Graphite is a lubricant.
  - D Graphite is a non-metal.
- 9 Solid F is an element.  
Solid G is a compound.  
Neither solid conducts electricity but G conducts electricity when dissolved in water.

These properties suggest that F is .....1..... and that G is .....2..... with .....3..... bonds.

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
<b>A</b>	diamond	AgCl	covalent
<b>B</b>	diamond	NaCl	ionic
<b>C</b>	graphite	AgCl	ionic
<b>D</b>	graphite	NaCl	covalent

10 The diagrams show the structures of two forms, P and Q, of a solid element.



What are suitable uses of P and Q, based on their structures?

	use of solid P	use of solid Q
<b>A</b>	drilling	drilling
<b>B</b>	drilling	lubricating
<b>C</b>	lubricating	drilling
<b>D</b>	lubricating	lubricating

11 Statements 1, 2 and 3 are about diamond and graphite.

- 1 They are different solid forms of the same element.
- 2 They each conduct electricity.
- 3 They have atoms that form four equally strong bonds.

Which statements are correct?

- A** 1 only      **B** 3 only      **C** 1 and 3      **D** 2 and 3