

Macromolecules

Question Paper 1

Level	IGCSE
Subject	Chemistry (0620/0971)
Exam Board	Cambridge International Examinations (CIE)
Topic	Atoms, elements and compounds
Sub-Topic	Macromolecules
Booklet	Question Paper 1

Time Allowed: 23 minutes

Score: /19

Percentage: /100

Grade Boundaries:

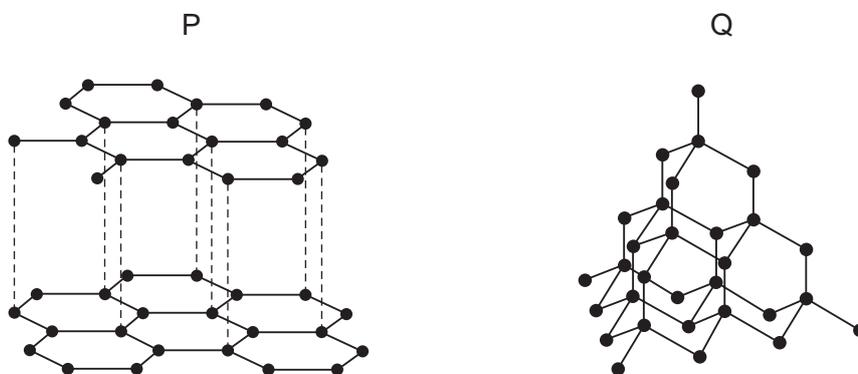
9	8	7	6	5	4	3	2	1
>85%	75%	68%	60%	53%	48%	40%	33%	<25%

- 1 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

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

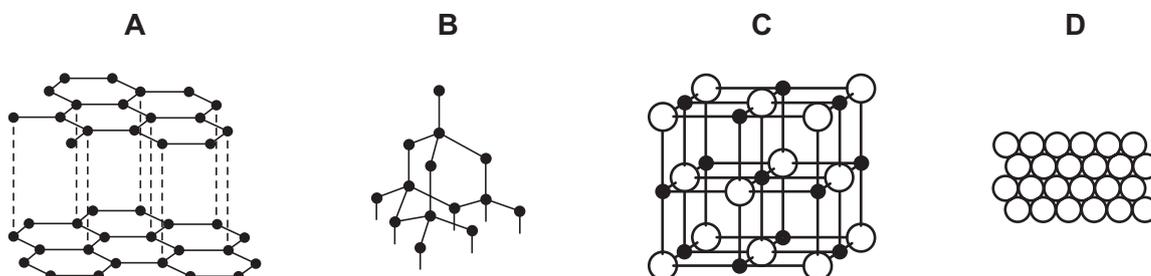


What are suitable uses of P and Q, based on their structures?

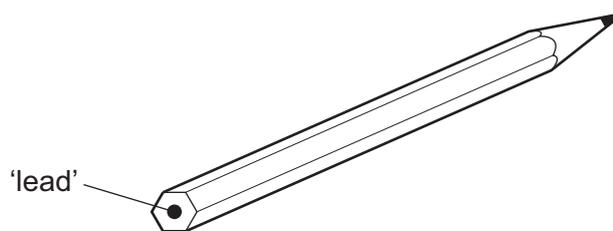
	use of solid P	use of solid Q
A	drilling	drilling
B	drilling	lubricating
C	lubricating	drilling
D	lubricating	lubricating

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

Which diagram shows a structure most like that of slate?



- 4 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.

- 5 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 is1..... and that G is2..... with3..... bonds.

Which words correctly complete gaps 1, 2 and 3?

	1	2	3
A	diamond	AgCl	covalent
B	diamond	NaCl	ionic
C	graphite	AgCl	ionic
D	graphite	NaCl	covalent

- 6 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?

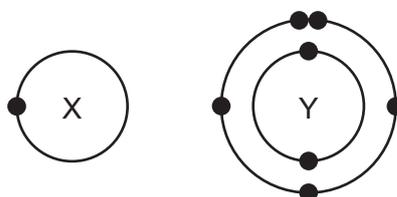
- A** 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

7 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.

8 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

9 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.

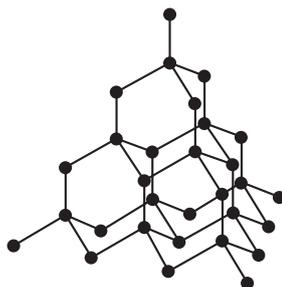
10 Two statements about diamond are given.

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

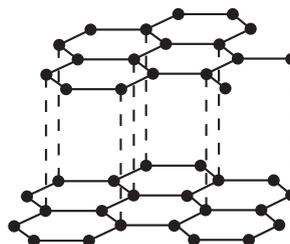
Which is correct?

- 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.

11 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.

12 Which statement explains why graphite is used a lubricant?

- A** All bonds between the atoms are weak.
- B** It conducts electricity.
- C** It has a low melting point.
- D** Layers in the structure can slide over each other.

13 Two statements about silicon(IV) oxide are given.

- 1 It is a hard substance.
- 2 It has a macromolecular structure with strong covalent bonds.

Which is correct?

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

14 Which row describes silicon(IV) oxide?

	has a giant structure	is an acidic oxide	conducts electricity
A	✓	✓	✓
B	✓	✓	x
C	✓	x	x
D	x	✓	✓

15 Which compound is silicon(IV) oxide?

	melting point / °C	good electrical conductor when solid	good electrical conductor when molten
A	-73	no	no
B	801	no	yes
C	1495	yes	yes
D	1710	no	no

16 Diamond is extremely hard and does not conduct electricity.

Which statement explains these properties?

- A It has a lattice of positive carbon ions in a 'sea of electrons'.
- B It has delocalised electrons and each carbon atom forms three covalent bonds with other carbon atoms.
- C It has no delocalised electrons and each carbon atom forms four covalent bonds with other carbon atoms.
- D It has strong ionic bonds between each carbon atom.

17 Graphite and diamond are both forms of the element carbon.

Which row shows the number of other carbon atoms that each carbon atom is covalently bonded to in graphite and diamond?

	graphite	diamond
A	3	3
B	3	4
C	4	3
D	4	4

18 Which substance is a macromolecule?

- A ammonia
- B carbon dioxide
- C diamond
- D water

19 Diamond and silicon(IV) oxide both have giant structures.

Which statements are correct?

- 1 Both substances are compounds.
- 2 There are strong covalent bonds in diamond.
- 3 Silicon(IV) oxide is bonded ionically.
- 4 Both substances have very high melting points.

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