IGCSE · Cambridge (CIE) · Chemistry

16 mins 16 questions

Multiple Choice Questions

Giant Structures

Diamond & Graphite / Silicon(IV) Oxide / Metallic Bonding

Easy (5 questions)	/5
Medium (5 questions)	/5
Hard (6 questions)	/6
Total Marks	**/16**

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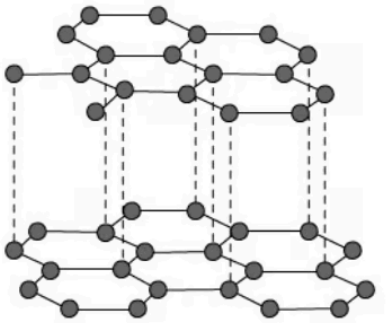
Easy Questions

1 The structures of two solids X and Y are shown below.



X

Y

What are the correct uses of these structures?

	X	Y
A	industrial lubricating	glass cutters
B	industrial lubricating	industrial lubricating
C	glass cutters	industrial lubricating
D	glass cutters	glass cutters

(1 mark)

2 Graphite is used extensively as a lubricating material. It is also used in pencils and in the manufacture of electrodes for electrolysis.

Which row describes how graphite can be used in electrolysis?

	property	use
A	delocalised electrons	conducts electricity
B	delocalised electrons	acts as an insulator
C	low melting point	acts as an insulator
D	low melting point	conducts electricity

(1 mark)

3 Graphite is used to produce electrodes due to its ability to conduct electricity.

What other property does graphite have that makes it useful for this application?

A. Graphite is an unreactive substance and doesn't react with the electrolyte.

B. Graphite is soft and easy to shape into electrodes.

C. Graphite has a low melting point due to the weak forces in between the layers.

D. Graphite dissolves readily in water.

(1 mark)

4 Extended Only

Which statement correctly describes the bonding in metals?

A. A lattice of negative ions in a "sea of electrons".

B. A lattice of positive ions in a "sea of electrons".

C. A lattice of neutral atoms with delocalised electrons.

D. A lattice of negative ions with delocalised electrons.

(1 mark)

5 Extended Only

Which row provides a correct description of the properties of metals?

	melting point	boiling point	conducts electricity
A	high	low	×
B	low	high	✓
C	low	low	×
D	high	high	✓

(1 mark)

Medium Questions

1 Which of the following statements about graphite and diamond are incorrect?

1	They are allotropes of carbon.
2	They both conduct electricity.
3	They form different numbers of bonds within their structures.
4	They have different uses.

A. 2 and 3

B. 2 only

C. 1, 3 and 4

D. 2 and 4

(1 mark)

2 Which statement correctly describes the structure of macromolecules?

A. Giant molecular crystal which is held together by weak intermolecular forces.

B. Giant molecular crystal which is held together by strong ionic bonds.

C. Giant molecular crystal which is held together by weak metallic bonds.

D. Giant molecular crystal which is held together by strong covalent bonds.

(1 mark)

3 Which statement about graphite and diamond is not correct?

A. Graphite is a good lubricant due to the weak forces in between the layers.

B. Diamond is used as a drill tip because it is an extremely hard substance.

C. Graphite has a low melting point due to the weak forces in between the layers.

D. Diamond is an allotrope of carbon.

(1 mark)

4 Separate: Chemistry and Extended Only

The following statements describe the structure and properties of silicon(IV) oxide.

1. Giant covalent structure held together by many strong covalent bonds.
2. It is a very hard substance.

Which of the following is correct for statements 1 and 2?

A. Statement 2 is correct but statement 1 is incorrect.

B. Both statements are incorrect.

C. Both are correct and statement 1 explains statement 2.

D. Both are correct and statement 2 explains statement 1.

(1 mark)

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

1. They have atoms that form three equally strong bonds
2. They are both formed from the same element
3. They each conduct electricity

Which statement(s) is / are correct?

A. 1 only

B. 2 only

C. 1 and 3

D. 1 and 2

(1 mark)

Hard Questions

1 Separate: Chemistry and Extended Only

Which statement correctly describes the arrangement of atoms in silicon dioxide?

A. Each silicon atom is bonded to two oxygen atoms and each oxygen atom is bonded to one silicon atom.

B. Each silicon atom is bonded to four oxygen atoms and each oxygen atom is bonded to two silicon atoms.

C. Each silicon atom is bonded to four oxygen atoms and each oxygen atom is bonded to four silicon atoms.

D. Each silicon atom is bonded to two oxygen atoms and each oxygen atom is bonded to four silicon atoms.

(1 mark)

2 Separate: Chemistry and Extended Only

Which of the following statements about silicon(IV) dioxide and diamond are correct?

1	Silicon(IV) dioxide forms a giant ionic lattice structure.
2	They are both compounds.
3	They both have very high melting points.
4	There are strong covalent bonds in silicon(IV) dioxide.

A. 1 and 3

B. 1 only 2

C. 1, 2 and 4

D. 3 and 4

(1 mark)

3 Separate: Chemistry and Extended Only

Which row correctly describes the use of graphite and silicon(IV) dioxide?

	graphite	**silicon(IV) dioxide**
A	electrodes	production of plastics
B	electrolyte	production of glass
C	electrolyte	production of plastics
D	electrodes	production of glass

(1 mark)

4 Separate: Chemistry and Extended Only

Which row provides a correct description of the structure and properties of silicon(IV) oxide?

	forms an acidic oxide	has a giant structure	conducts electricity
A	✓	✓	×
B	✓	×	✓
C	×	✓	×
D	×	×	✓

(1 mark)

5 Extended Only

Metallic bonds are very strong and give metals their properties. Which of the following definitions is correct for a metallic bond?

A. A metallic bond is formed by the electrostatic attraction that occurs due to electron transfer between metal atoms.

B. A metallic bond is formed by the electrostatic attraction between the positive ions and the delocalised electrons.

C. A metallic bond is formed by the electrostatic attraction that occurs due to the uneven sharing of electrons between metal atoms.

D. A metallic bond is formed by the intermolecular forces between the positive metal ions and the delocalised electrons.

(1 mark)

6 Extended Only

Metals are malleable and ductile and can be hammered and pulled into useful shapes.

Which statement correctly explains these properties?

A. Layers of atoms in the metal lattice are rigid and held strongly together so they cannot move.

B. Layers of atoms in a metal can slide over one another and break the attractive forces that hold them together.

C. Layers of atoms in a metal can slide over one another and new attractive forces are formed between the metal ions and the delocalised electrons.

D. Layers of atoms in a metal cannot slide over one another and the attractive forces between the metal ions and the delocalised electrons are unbreakable.

(1 mark)