

1 (a) Sodium chloride is a metal chloride which is soluble in cold water.

(i) Give the name of a metal chloride which is insoluble in cold water.

Put a cross (☒) in the box next to your answer.

(1)

- A** copper chloride
- B** lead chloride
- C** magnesium chloride
- D** potassium chloride

(ii) Sodium chloride has a melting point of 801 °C.

Explain why the melting point of sodium chloride is high.

(2)

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(iii) Describe how you would test for the presence of chloride ions in a solution of sodium chloride.

(3)

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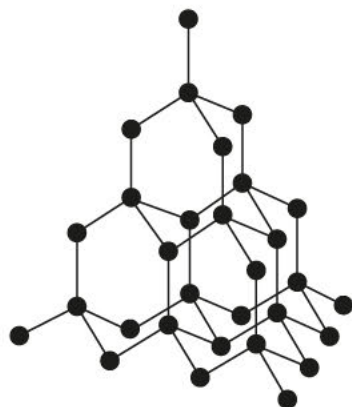
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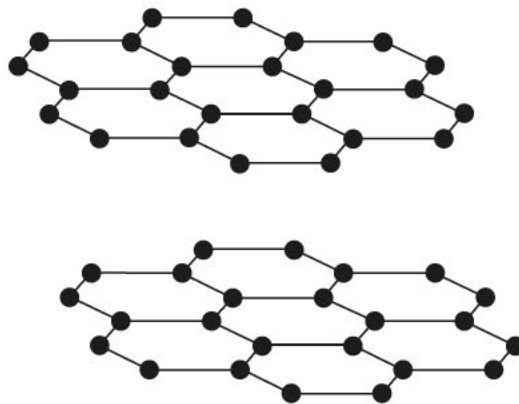
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2 (a) The structures of diamond and graphite are shown.



diamond



graphite

(i) State the maximum number of covalent bonds formed by a carbon atom in a diamond crystal.

(1)

(ii) Which of the following statements about diamond and graphite is true?

Put a cross (☒) in the box next to your answer.

(1)

- A they are both good conductors of electricity
- B they are both soluble in water
- C they both cut glass
- D they both have high melting points

(iii) Explain, in terms of its structure, why graphite is able to be used as a lubricant.

(2)

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(b) The atomic number of carbon is 6.

The atomic number of hydrogen is 1.

Draw a dot and cross diagram of a molecule of methane, CH₄.

Show the outer shell electrons only.

(2)

Handwriting practice area consisting of 25 horizontal dotted lines.

(Total for Question 2 = 12 marks)

3 Nitrogen and oxygen are present in the air.

(a) In industry, nitrogen and oxygen are obtained from air.

(i) Give the name of the process used.

(1)

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(ii) State why the air is cooled before the start of the process.

(1)

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(b) Complete the sentence by putting a cross (☒) in the box next to your answer.

Oxygen has a low boiling point because there are

(1)

- A** weak covalent bonds between the oxygen atoms
- B** weak covalent bonds between the oxygen molecules
- C** weak forces of attraction between the oxygen atoms
- D** weak forces of attraction between the oxygen molecules

(c) Another gas present in air is carbon dioxide, CO_2 .
There are covalent bonds between the atoms in a molecule of carbon dioxide.

(i) Describe what is meant by a **covalent bond**.

(2)

(ii) The electronic configuration of oxygen (atomic number 8) is 2.6.

Give the electronic configuration of carbon (atomic number 6).

(1)

(iii) Draw a dot and cross diagram of a molecule of carbon dioxide.

Show outer electrons only.

(2)

(Total for Question 3 = 8 marks)