AQA GCSE CHEMISTRY (HIGHER) · 8462

CHEMISTRY



EXAM QUESTION PACK

4.2.2 HOW BONDING AND STRUCTURE ARE RELATED TO THE PROPERTIES OF SUBSTANCES (PACK 4)

SCORE	PERCENTAGE
/36	%

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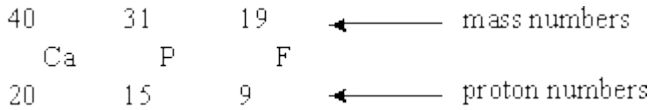
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Q1.

Atoms of calcium, phosphorus and fluorine are represented below, each with its mass number and proton number.



(a) Use this information to complete the table.

	CALCIUM	PHOSPHORUS	FLUORINE
Number of protons in the nucleus	20		9
Number of neutrons in the nucleus	20	16	
Number of electrons		15	9

(3)

(b) Calcium and fluorine atoms can combine to form the compound calcium fluoride, CaF_2.

The fluoride ion is represented by F^-.

(i) Explain how the fluorine atom forms a fluoride ion.

_____

_____

(2)

(ii) How is the calcium ion represented?

_____

(2)

(c) Phosphorus and fluorine form a covalent compound, phosphorus trifluoride.

Complete the sentences below which are about this compound.

Phosphorus trifluoride is made up of phosphorus and fluorine _____

These are joined together by sharing pairs of _____ to form

phosphorus trifluoride _____ .

(3)

(d) (i) Sodium chloride, an ionic compound, has a high melting point whereas paraffin wax, a molecular compound, melts easily.

Explain why.

_____

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_____

_____

_____

(2)

(ii) Molten ionic compounds conduct electricity but molecular compounds are non-conductors, even when liquid.

Explain why.

_____

_____

_____

(2)

(Total 14 marks)

Q2.

Here is a symbol equation, with state symbols, for a chemical reaction between solutions of lead nitrate and potassium chloride.

$$Pb(NO_3)_{2\,(aq)} + 2\,KCl_{(aq)} \longrightarrow 2KNO_{3\,(aq)} + PbCl_{2\,(s)}$$

The equation tells you the formulae of the two products of the reaction.

(a) What are the names of the **two** products?

1. _____

2. _____

(2)

(b) What else does the equation tell you about these products?

_____

_____

_____

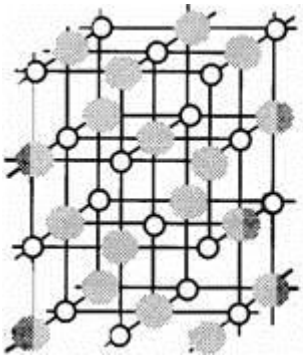
(2)

(Total 4 marks)

Q3.

The diagrams show the giant structures of sodium chloride and diamond.

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sodium chloride (melting point 801°C)



diamond (melting point 4800°C)

(a) The equation shows how sodium choride could be formed.

Balance the equation.

$$Na + Cl_2 \rightarrow Na\,Cl$$

(1)

(b) By reference to the detailed structure of sodium chloride explain fully why:

(i) sodium chloride has a quite high melting point,

_____

_____

_____

_____

(1)

(ii) solid sodium chloride melts when it is heated strongly,

_____

_____

(2)

(iii) molten sodium chloride will conduct electricity.

_____

_____

(1)

(c) By reference to the detailed structure of diamond, explain why the melting point of diamond, is higher than that of sodium chloride.

_____

_____

_____

_____

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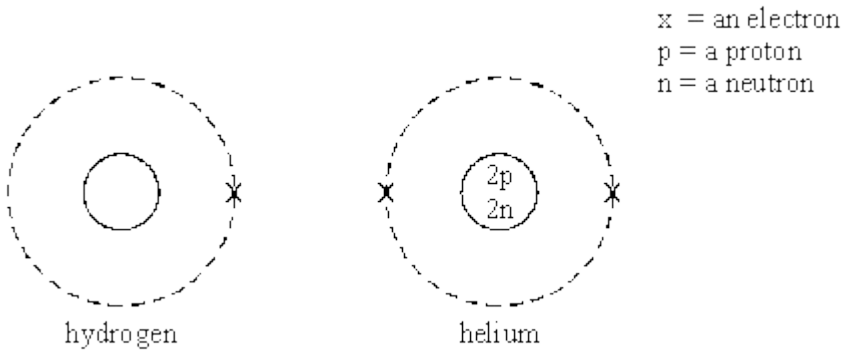
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(2)

(Total 7 marks)

Q4.

(a) The diagrams represent the atomic structures of two gases, hydrogen and helium.



Hydrogen gas is made up of diatomic molecules (molecules with two atoms).
Helium gas exists as single atoms.

(i) How is a molecule of hydrogen formed from two hydrogen atoms?
(You may use a diagram as part of your answer)

_____

_____

_____

(2)

(ii) Why does helium exist only as single atoms?

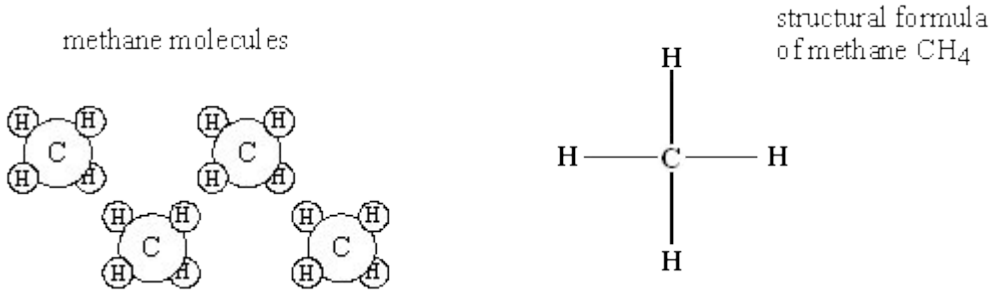
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(2)

(b) Hydrogen combines with carbon to form methane.
Each molecule contains four hydrogen atoms strongly bonded to a carbon atom.



Explain why methane has a low boiling point.

_____

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_____

_____

_____

(2)

(Total 6 marks)

Q5.

(a) Copper is a metal.
Explain how it conducts electricity.

_____

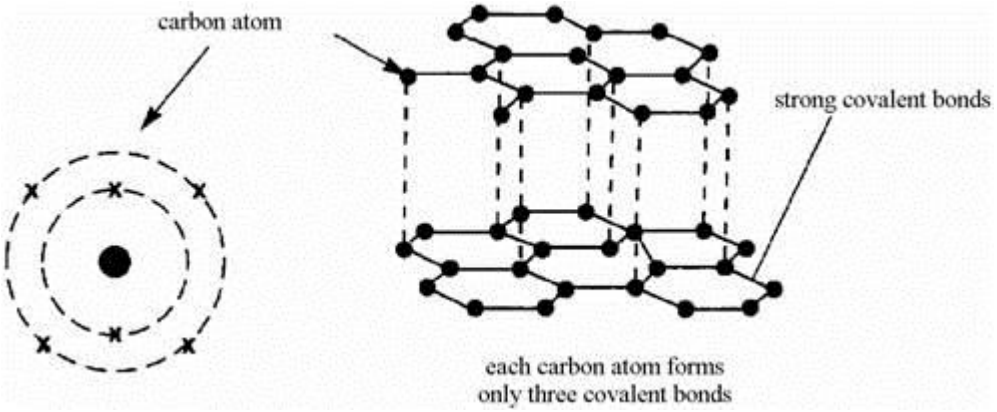
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(2)

(b) Graphite is a non-metal.



Use the information to explain why graphite conducts electricity.

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

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