

Unit 1 – Atomic Structure and Bonding Revision PPQu

1. This question is about states of matter.

(a) Use the words solid, liquid or gas to give the initial and final state of matter for each of the changes listed in the table.

The first one has been done for you.

(3)

Change	Initial state	Final state
melting	solid	liquid
sublimation		
condensing		
evaporation		

(b) Particles in a solid are closely packed, arranged in a regular pattern and vibrate about fixed positions.

Describe the arrangement and movement of the particles in a gas.

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(Total for question = 6 marks)

- (a) The table shows the number of protons, neutrons and electrons in species F, G and H.

	Species F	Species G	Species H
number of protons	7	7	7
number of neutrons	7	8	7
number of electrons	7	7	10

- (i) Give the mass number of F. (1)

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- (ii) Give the electronic configuration of G. (1)

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- (iii) Explain why F and G are isotopes of the same element.
Refer to subatomic particles in your answer. (2)

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- (iv) Explain why H is a negative ion.
Refer to subatomic particles and their charges in your answer. (2)

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- (b) A sample of carbon contains atoms of mass number 12 and 13
The table shows the percentages of these atoms in the sample.

Mass number	Percentage (%)
12	98.930
13	1.070

Calculate the relative atomic mass (A_r) of this sample of carbon.
Give your answer to two decimal places.

(2)

relative atomic mass =

(Total for question = 8 marks)

3. This question is about carbon and its compounds.

(a) (i) Draw a dot-and-cross diagram to show the outer shell electrons in a molecule of carbon dioxide, CO_2 (2)

(ii) The atoms in carbon dioxide are held together by covalent bonds.
Describe the forces of attraction in a covalent bond. (2)

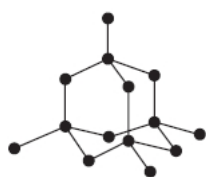
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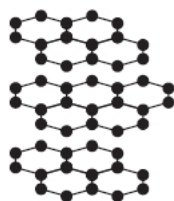
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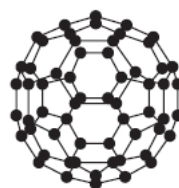
(b) The diagram shows three different structures of carbon.



diamond



graphite



C₆₀ fullerene

(i) Explain why graphite conducts electricity.

(2)

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(ii) Explain why diamond has a much higher melting point than C₆₀ fullerene.
Refer to structure and bonding in your answer.

(5)

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(Total for question = 11 marks)

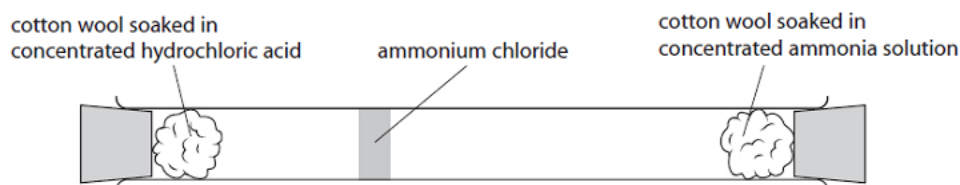
4. This question is about ammonium chloride.

(a) Give the formula of the ammonium ion.

(1)

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(b) The diagram shows the formation of ammonium chloride in a glass tube.



(i) Explain how the mean speed of ammonia molecules compares with the mean speed of hydrogen chloride molecules. (2)

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(ii) Gas particles travel very quickly. Give two reasons why it takes several minutes for the ammonium chloride to form. (2)

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(Total for question = 5 marks)

TOTAL MARKS FOR QUESTIONS: 30

Extension

5. The formation of ions and covalent bonds involves electrons.

The table gives the electronic configurations of atoms of hydrogen, lithium and chlorine.

Element	Electronic configuration of atom
hydrogen	1
lithium	2.1
chlorine	2.8.7

(a) Describe the different roles of electrons in the formation of

- ions in lithium chloride
- covalent bonds in hydrogen chloride

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(b) Explain why lithium chloride has a higher melting point than hydrogen chloride.
Refer to structure and bonding in your answer. (5)

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(Total marks for extension question: 8 marks)