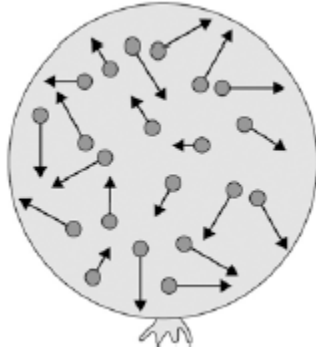


1

The figure below shows a balloon filled with helium gas.



(a) Describe the movement of the particles of helium gas inside the balloon.

.....
.....
.....
.....

(2)

(b) What name is given to the total kinetic energy and potential energy of all the particles of helium gas in the balloon?

Tick **one** box.

External energy	<input type="checkbox"/>
Internal energy	<input type="checkbox"/>
Movement energy	<input type="checkbox"/>

(1)

(c) Write down the equation which links density, mass and volume.

.....

(1)

(d) The helium in the balloon has a mass of 0.00254 kg.

The balloon has a volume of 0.0141 m³.

Calculate the density of helium. Choose the correct unit from the box.

m³ / kg	kg / m³	kg m³
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.....

.....

.....

.....

Density = Unit

(3)
(Total 7 marks)

.....

.....

.....

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.....

.....

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.....

.....

(Total 6 marks)

Mark schemes

1	(a) range of speeds	1
	moving in different directions <i>accept random motion</i>	1
	(b) internal energy	1
	(c) density = mass / volume	1
	(d) 0.00254 / 0.0141	1
	0.18	1
	<i>accept 0.18 with no working shown for the 2 calculation marks</i>	1
	kg / m ³	1
		[7]

2

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1–2 marks)

Considers either solid or gas and describes at least one aspect of the particles.

or

Considers both solids and gases and describes an aspect of each.

Level 2 (3–4 marks)

Considers both solids and gases and describes aspects of the particles.

or

Considers one state and describes aspects of the particles and explains at least one of the properties.

or

Considers both states and describes an aspect of the particles for both and explains a property for solids or gases.

Level 3 (5–6 marks)

Considers both states of matter and describes the spacing and movement / forces between the particles. Explains a property of both solids and gases.

examples of the points made in the response

extra information

Solids

- (particles) close together
- (so) no room for particles to move closer (so hard to compress)
- vibrate about fixed point
- strong forces of attraction (at a distance)
- the forces become repulsive if the particles get closer
- particles strongly held together / not free to move around (shape is fixed)

any explanation of a property must match with the given aspect(s) of the particles.

Gases

- (particles) far apart
- space between particles (so easy to compress)
- move randomly
- negligible / no forces of attraction
- spread out in all directions (to fill the container)

[6]