

Ideal Gas Molecules

Question Paper

Level	GCSE
Subject	Physics
Exam Board	Edexcel IGCSE
Module	Single Award (Paper 2P)
Topic	Solids, Liquids and Gases
Sub-Topic	Ideal Gas Molecules
Booklet	Question Paper

Time Allowed: 43 minutes

Score: /36

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	75%	70%	60%	55%	50%	<50%

2. James Dewar was a scientist who investigated liquid oxygen.

(a) He discovered that the boiling point of liquid oxygen is $-183\text{ }^{\circ}\text{C}$.

(i) Convert $-183\text{ }^{\circ}\text{C}$ to a temperature on the Kelvin scale.

(1)

Temperature = K

(ii) Use ideas about particles to describe the changes that happen when a liquid boils to form a gas.

(3)

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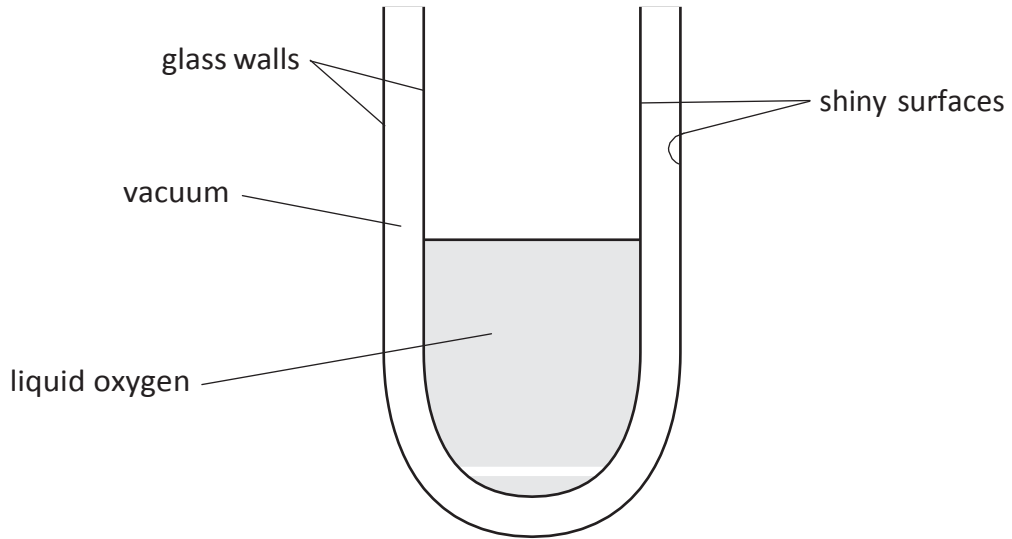
(b) Dewar invented a special flask for storing liquid oxygen in the laboratory.

It was designed to reduce heat flow from the air outside to the liquid oxygen inside.

The flask had two glass walls with a vacuum between them.

The inside glass surfaces were each covered with a thin layer of shiny metal.

The diagram shows a cross section of the flask.



(i) Explain how the **shiny surfaces** reduce the thermal energy transferred to the liquid oxygen from the laboratory.

(2)

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(ii) Explain how the **vacuum** reduces the thermal energy transferred to the liquid oxygen from the laboratory.

(2)

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(c) Dewar's flask did not have a lid when it was holding liquid oxygen.

Suggest why a lid was not needed.

(2)

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(Total for Question 2 = 10 marks)

3. The properties of materials can be explained using particle theory.

Brownian motion provides evidence to support particle theory.

(a) (i) Give an example of Brownian motion.

(1)

(ii) Explain how Brownian motion supports the idea that matter is made from tiny particles in continuous motion.

(2)

(b) These are some observations about samples of ice, water and steam.

	Shape	Size
ice	keeps a fixed shape	keeps a fixed size
water	takes the shape of the container	keeps a fixed size
steam	takes the shape of the container	fills the container

Explain each of the observations in terms of the arrangement and motion of the particles.

You may use diagrams to help your answer.

(6)

particles in ice

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particles in water

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particles in steam

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(Total for Question 3 = 9 marks)

4. This question is about temperature and pressure in gases.

(a) A gas is heated in a container which has a constant volume.

The particles in the gas

(1)

- A expand
- B hit the walls of the container harder
- C move closer together
- D have a lower average speed

(b) Describe what happens to the average kinetic energy of particles as the temperature decreases from 10 K towards 0 K.

(2)

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(c) (i) Convert a temperature of 27 °C into kelvin (K).

(1)

temperature = K

(ii) The gas in a cylinder has a pressure of 210 kPa at a temperature of 27 °C.

Calculate the new pressure when the temperature of the gas rises to 81 °C.

(3)

pressure = kPa

(Total for Question 4 = 7 marks)