AQA GCSE PHYSICS (HIGHER) · 8463

PHYSICS



EXAM QUESTION PACK

4.3.3 PARTICLE MODEL AND PRESSURE (PACK 1)

SCORE	PERCENTAGE
/39	%

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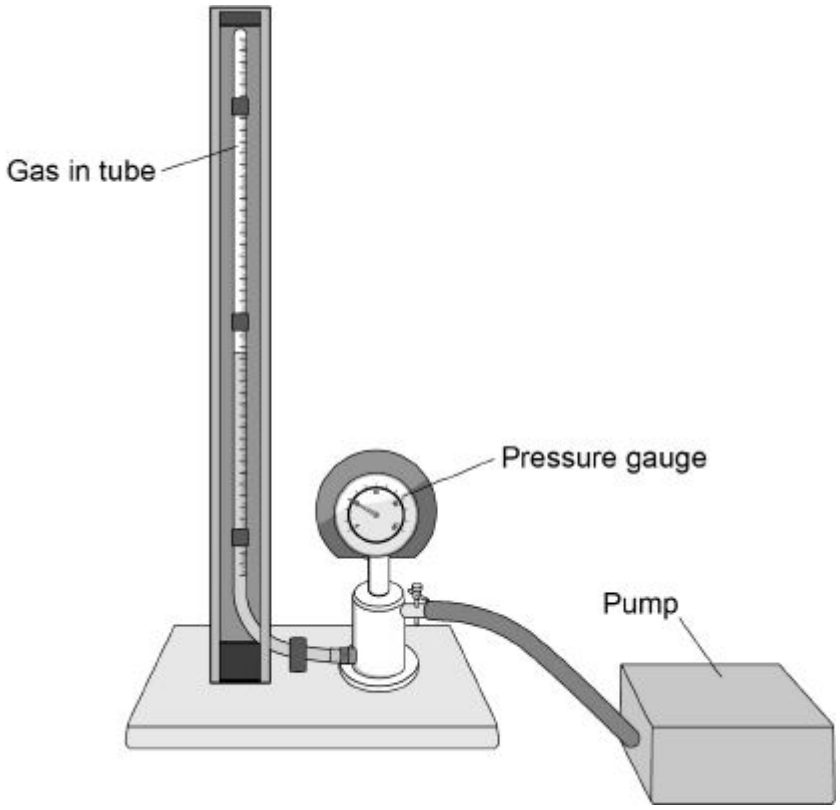
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Q1.

A student investigated how the pressure exerted by a gas varied with the volume of the gas.

Figure 1 shows the equipment the student used.

Figure 1



A pump was used to compress the gas in a tube. As the volume of the gas decreases, the pressure of the gas increases.

(a) The student only recorded one set of results.

Give **two** reasons why taking repeat readings could provide more accurate data.

1. _____

_____

2. _____

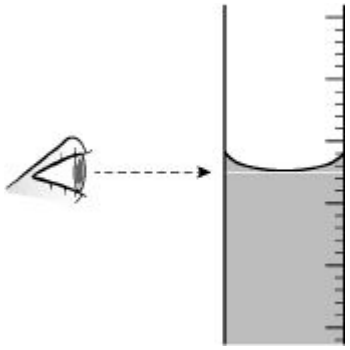
_____

(2)

(b) **Figure 2** shows the position of the student's eye when taking volume measurements.

Figure 2

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Explain what type of error would be caused if the student's eye was **not** in line with the level of the liquid in the tube.

_____

_____

_____

_____

(2)

(c) If the gas is compressed too quickly the temperature of the gas increases.

Explain how the temperature increase would affect the pressure exerted by the gas.

_____

_____

_____

_____

(2)

(d) One of the student's results is given below.

pressure = 1.6×10^5 Pa
volume = 9.0 cm^3

Calculate the volume of the gas when the pressure was 1.8×10^5 Pa.

The temperature of the gas was constant.

_____

_____

_____

_____

Volume = _____ cm^3

(3)

(e) **Figure 3** shows a person using a bicycle pump to inflate a tyre.

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Figure 3



The internal energy of the air increases as the tyre is inflated.

Explain why.

_____

_____

_____

_____

(2)

(Total 11 marks)

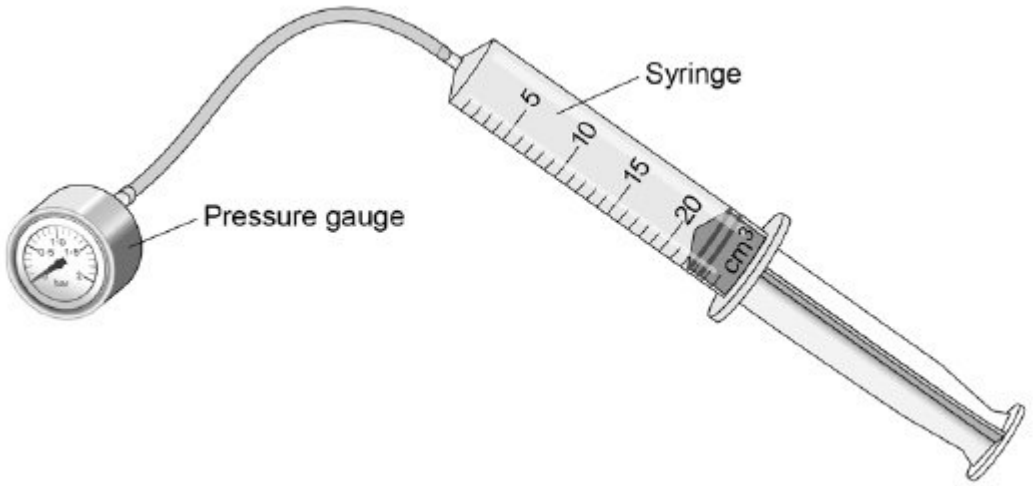
Q2.

A student investigated how the pressure of a gas varied with the volume of the gas.

The mass and temperature of the gas were constant.

The diagram shows the equipment the student used.

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(a) What is the range of the syringe?

Tick **one** box.

0 to 1 cm^3 ☐

0 to 5 cm^3 ☐

0 to 20 cm^3 ☐

0 to 25 cm^3 ☐

(1)

(b) What type of variable was the mass of gas?

Tick **one** box.

Control ☐

Dependent ☐

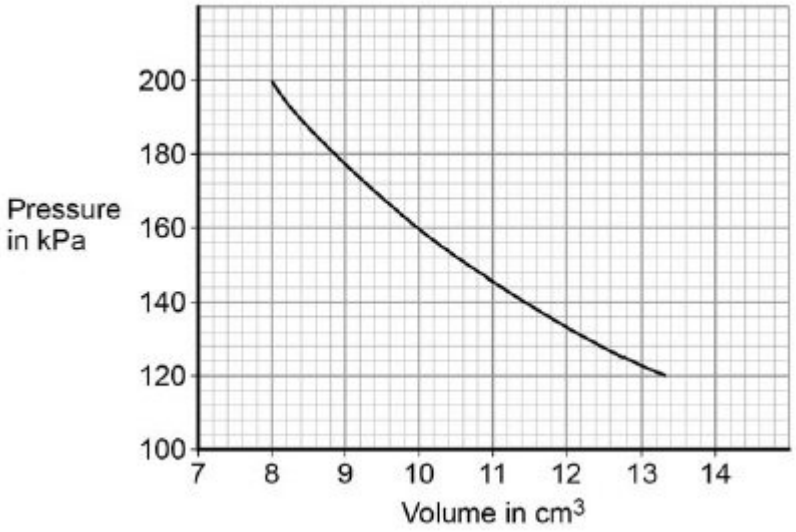
Independent ☐

(1)

The student compressed the gas in the syringe and read the pressure from the pressure gauge.

The graph shows the student's results.

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(c) The student concluded that when the pressure was multiplied by the corresponding volume the answer was the same.

Use data from the graph to show that the student's conclusion was correct.

_____

_____

_____

_____

_____

_____

(2)

(d) Complete the sentences.

Choose the answers from the box.

Each answer may be used once, more than once or not at all.

decreases	**increases**	**remains the same**

When the gas is compressed, the volume of gas in the syringe _____ .

So the number of collisions each second between the gas particles inside the syringe and the inside surface of the syringe _____ .

This means the force exerted on the inside surface of the container walls _____ .

(3)

(Total 7 marks)

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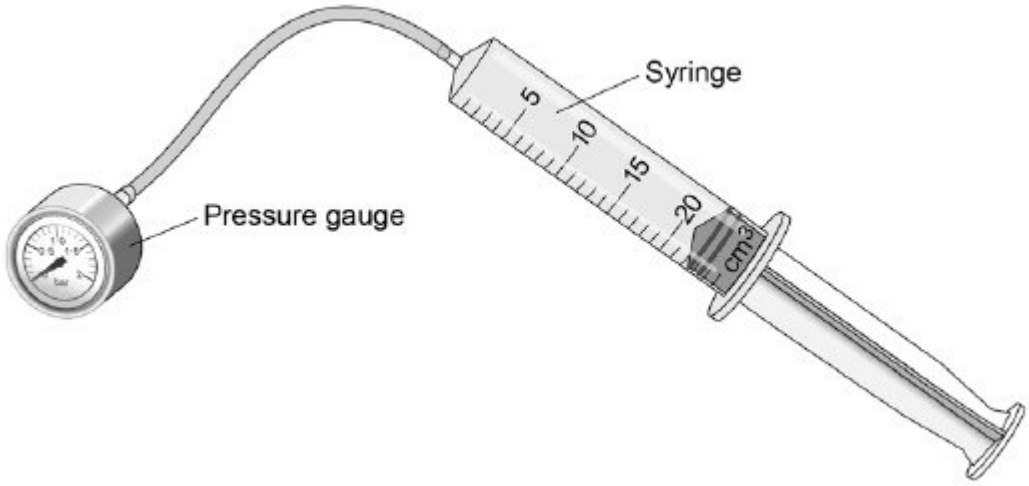
Q3.

A student investigated how the pressure of a gas varied with the volume of the gas.

The mass and temperature of the gas were constant.

Figure 1 shows the equipment the student used.

Figure 1



(a) What is the resolution of the syringe?

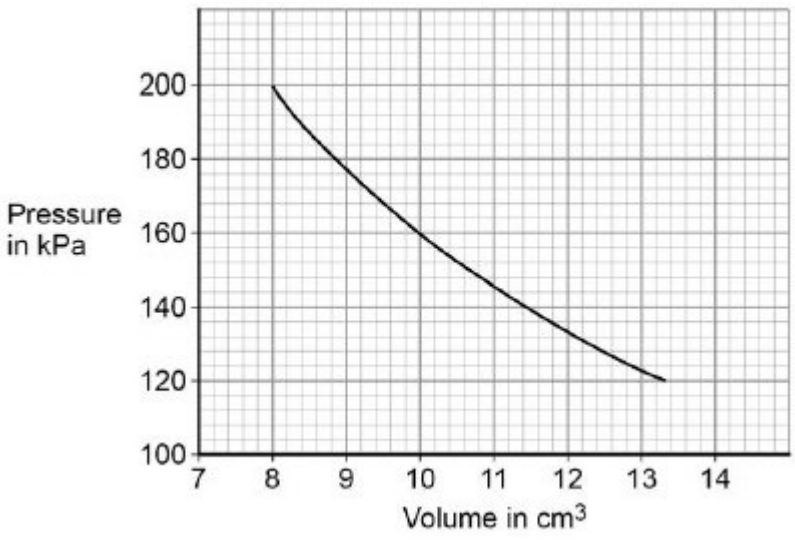
_____ cm^3

(1)

The student compressed the gas in the syringe and read the pressure from the pressure gauge.

Figure 2 shows the student's results.

Figure 2



(b) What conclusion can the student make from the data in **Figure 2**?

Use data from **Figure 2** in your answer.

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Give the reason for your answer.

_____

_____

_____

_____

_____

_____

(3)

(c) Explain why the pressure in the gas increases as the gas is compressed.

_____

_____

_____

_____

_____

_____

_____

_____

_____

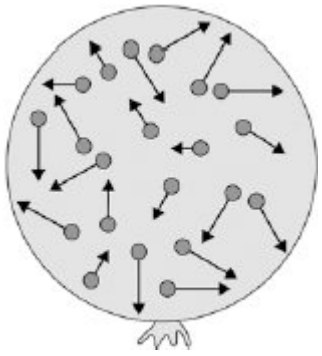
_____

(4)

(Total 8 marks)

Q4.

The figure below shows a balloon filled with helium gas.



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

_____

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_____

_____

_____

(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 ☐

Internal energy ☐

Movement energy ☐

(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 m^3.

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

m^3 / kg	**kg / m^3**	**kg m^3**

_____

_____

_____

_____

Density = _____ Unit _____

(3)

(Total 7 marks)

Q5.

In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.

The information in the box is about the properties of solids and gases.

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Solids:
- have a fixed shape
- are difficult to compress (to squash).

Gases:
- will spread and fill the entire container
- are easy to compress (to squash).

Use your knowledge of kinetic theory to explain the information given in the box.

You should consider:
- the spacing between the particles
- the movement of individual particles
- the forces between the particles.

Extra space _____

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_____

_____

_____

_____

_____

(Total 6 marks)

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