

Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Q1.

*A container is sealed so that the mass of the gas inside cannot change.

The volume of the gas is changed and the pressure is measured at different volumes.

The temperature of the gas does not change.

Figure 18 is a graph of the results.

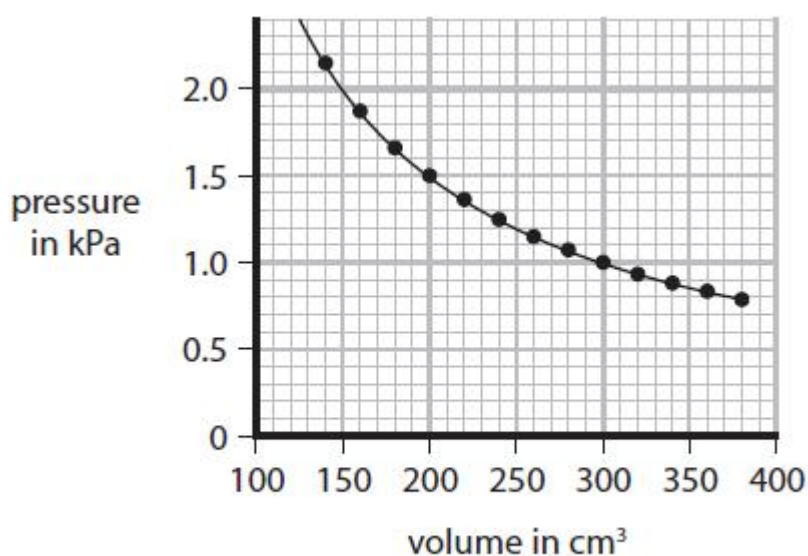


Figure 18

Explain, in terms of the movement of particles, why there is a pressure on the container and why the pressure changes as shown in Figure 18.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

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

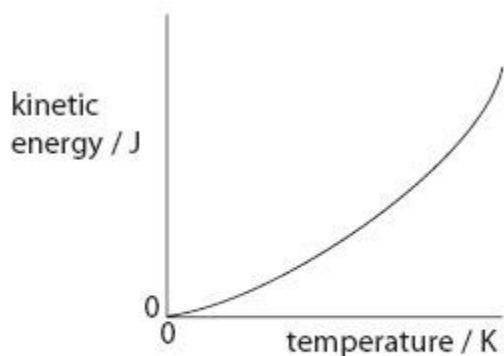
(Total for question = 6 marks)

Q2.

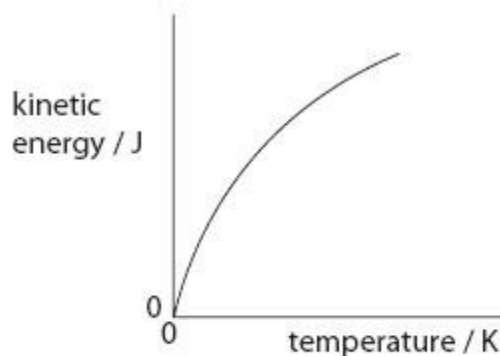
(a) Which graph shows the way in which the average kinetic energy of the molecules of a gas changes with temperature?

Put a cross () in the box next to your answer.

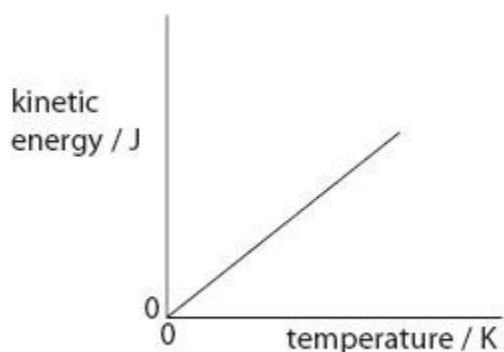
(1)



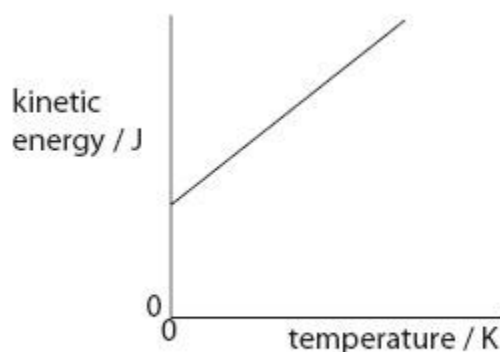
A



B



C



D

(b) The photograph shows a scuba diver.

She can breathe under water because she carries a cylinder of air on her back.



(i) The air molecules in the cylinder move randomly.

Describe how these air molecules exert a pressure on the cylinder.

(2)

.....

.....

.....

.....

(ii) The cylinder contains air at a pressure of 21 000 kPa.

The volume of air in the cylinder is 15.0 litres.

When the valve on the cylinder is opened, the air expands until its pressure is 100 kPa.

The temperature of the air does not change.
Show that the new volume of air is about 3 200 litres.

(2)

(iii) The cylinder is filled with air in a hot country and then taken to a cold country.

The temperature in the hot country is 305 K.

The temperature in the cold country is 278 K.

The pressure in the cylinder in the hot country is 21 000 kPa.

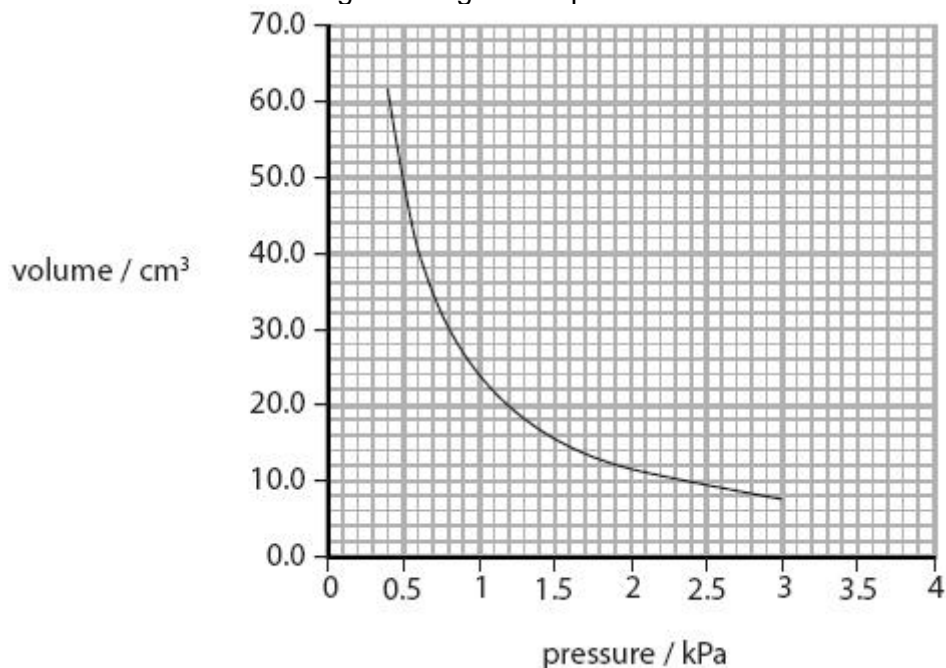
Calculate the pressure in the cylinder in the cold country.

(3)

(Total for Question = 8 marks)

Q3.

- (a) A student investigated how the volume and pressure of a gas were related. The graph shows how the volume of a gas changes with pressure.



The table shows the results used to plot the graph.

pressure / kPa	volume / cm ³
2.5
2.0	11.9
.....	14.0
1.4	17.0
1.0	24.0
0.4	61.5

- (i) Use the graph to complete the table.

(2)

- (ii) The results were taken at a constant temperature of 23 °C.

Complete the sentence by putting a cross () in the box next to your answer.

A temperature of 23 °C can be written in kelvin as

(1)

- A -273 K
 B 250 K
 C 273 K
 D 296 K

- (iii) Estimate a value for the volume when the pressure becomes 4 kPa.

(1)

volume =cm³

(iv) When the pressure of the gas is 2.2 kPa, the volume of the gas is 10.8 cm³.

Use the equation

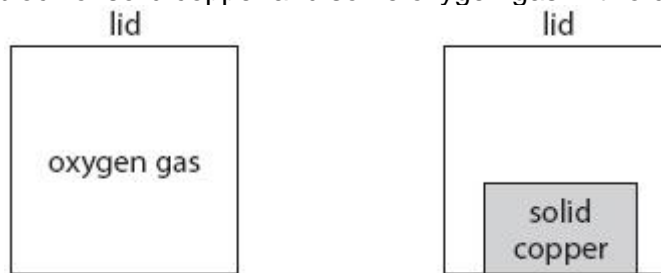
$$V_2 = \frac{P_1 V_1}{P_2}$$

to calculate the volume of the gas when the pressure of the gas is 0.2 kPa.

(2)

volume =cm³

*(b) The diagrams show a block of solid copper and some oxygen gas in two closed containers.



The oxygen exerts a pressure on the lid of its container.

The copper does not exert a pressure on the lid of its container.

Explain, using kinetic theory, why the oxygen exerts a pressure on the lid but the copper does not.

(6)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(Total for Question = 12 marks)