Pressure

Question Paper

Course	CIE IGCSE Physics
Section	1. Motion, Forces & Energy
Topic	Pressure
Difficulty	Medium

Time Allowed	**50**
Score	**/34**
Percentage	**/100**

Question 1a

Fig.5.1 shows a glass bottle containing air. The bottle is sealed with a cap.

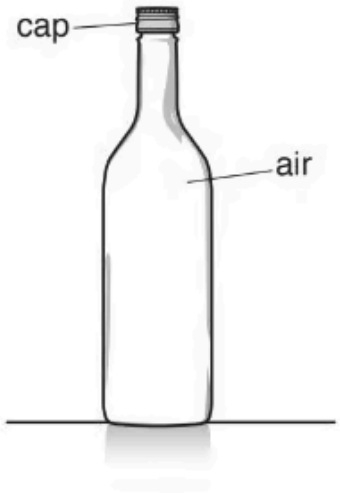

Fig. 5.1

The air in the bottle becomes warmer.

(i) State what happens to the pressure of the air in the bottle.

[1]

(ii) Explain why the pressure of the air in the bottle changes. Use your ideas about gas molecules.

[4]

[5 marks]

Question 1b

The bottle has a weight of 5.4 N and an area of 9.2 cm^2 in contact with the table.

Calculate the pressure produced by the bottle on the table. Give the unit.

pressure = ...

[3 marks]

Question 1c

Fig. 5.2 shows another bottle. The bottle is on a table. Part of the base of this bottle is not in contact with the table.

Fig. 5.2

(i) The base of the bottle is circular. The radius of the outer circle is 4.0 cm as shown in Fig. 5.3. Calculate the area of this circle.

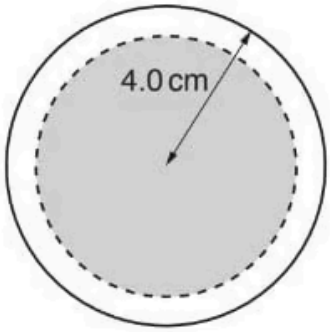

Fig. 5.3 (not to scale)

area = ... cm^2 [1]

(ii) The bottle shown in Fig. 5.2 has the same mass as the bottle shown in Fig. 5.1.

Explain why the bottle shown in Fig. 5.2 exerts more pressure on the table than the bottle shown in Fig. 5.1.

[1]

[2 marks]

Question 2a

Fig. 4.1 shows a pin. Fig. 4.2 shows a person pushing the pin into a wall.

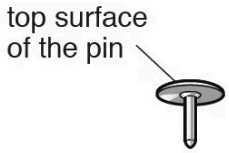

Fig. 4.1

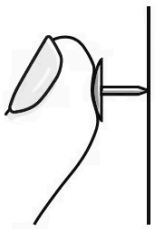

Fig. 4.2

The area of the top surface of the pin is 1.8 cm^2.

The person applies a force of 50 N.

Calculate the pressure exerted on the top surface of the pin.

pressure = ... N / cm^2

[3 marks]

Question 2b

The area of the top surface of the pin is 500 times larger than the area of the point.

Calculate the value of the pressure exerted by the point on the wall.

pressure = ... N / cm^2

[1 mark]

Question 3a

Fig 2.1 shows liquid in a cylinder.

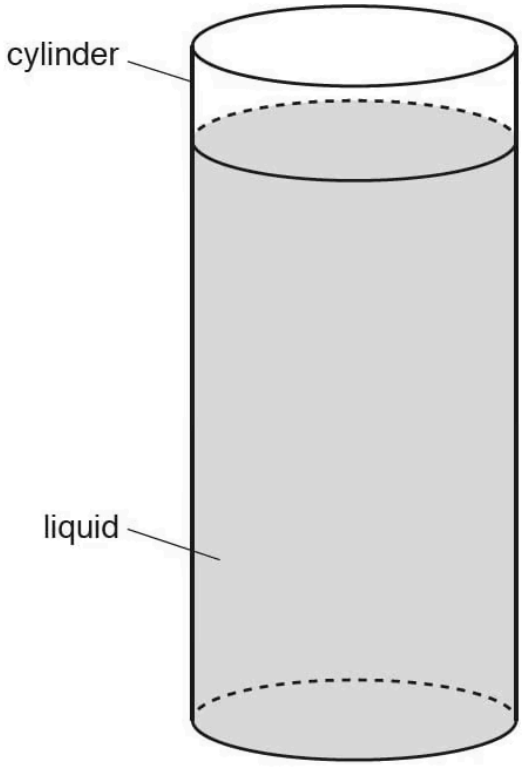

Fig. 2.1

Table 2.1 gives some data about the cylinder and the liquid.

Table 2.1

radius of cylinder	3.5 cm
weight of empty cylinder	2.5 N
depth of liquid	12.0 cm
density of liquid	900 kg / m^3

The cylinder containing liquid is placed on a digital balance that displays the mass in kg.

Calculate the reading shown on the balance.

reading .....kg

[4 marks]

Question 3b

Extended tier only

Fig. 2.2 shows a device called a manometer that measures the pressure of a gas.

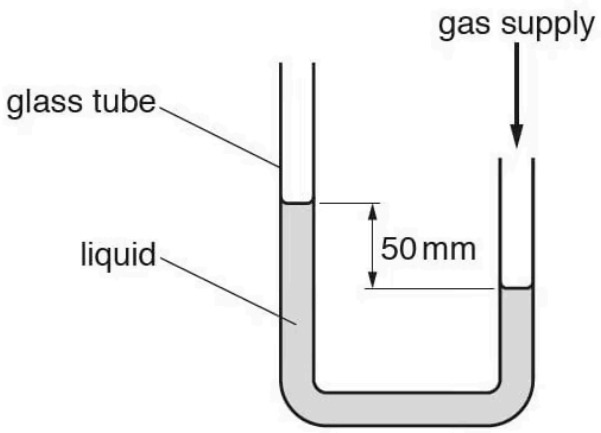

Fig. 2.2

(i) The pressure of the gas is 400 Pa greater than atmospheric pressure.

Calculate the density of the liquid.

density = ...[2]

(ii) With the gas supply connected, the top of the tube on the left of the device is sealed securely with a rubber stopper. The gas pressure is then increased.

State and explain what happens to the liquid in the manometer.

[2]

[4 marks]

Question 4a

Extended tier only

On a particular day, the atmospheric pressure is 1.0×10^5 Pa. A bubble of gas forms at a point 5.0 m below the surface of a lake. The density of water is 1000 kg/m^3.

Determine

(i) the total pressure at a depth of 5.0 m in the water,

pressure = ...[3]

(ii) the pressure of the gas in the bubble.

pressure = ...[1]

[4 marks]

Question 4b

Extended tier only

As the bubble rises to the surface, the mass of gas in the bubble stays constant. The temperature of the water in the lake is the same throughout.

Explain why the bubble rises to the surface and why its volume increases as it rises.

[3 marks]

Question 5a

Fig. 3.1 shows an archer pulling the string of a bow.

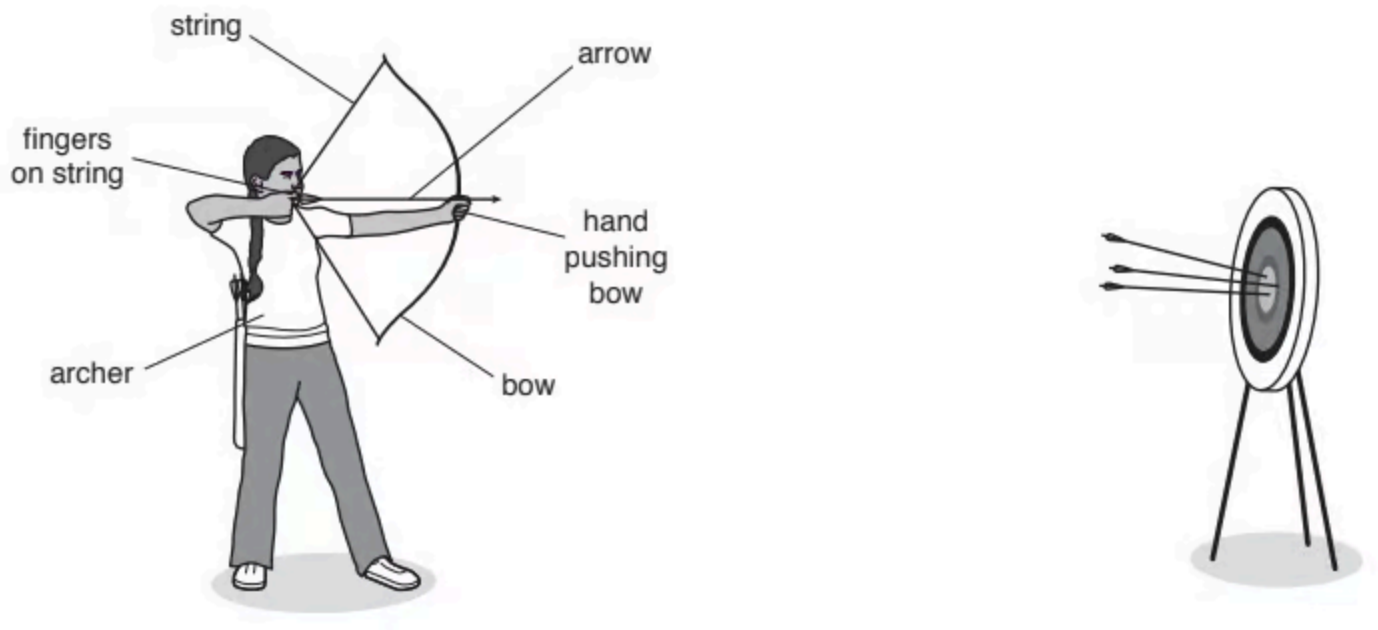

Fig. 3.1

The archer uses a force of 120 N. The force acts on an area of 0.5 cm^2 on the archer's fingers.

Calculate the pressure on the archer's fingers.

pressure on fingers = ... N/cm^2

[3 marks]

Question 5b

The archer's other hand is pushing the bow with the same force of 120 N. This force acts on a larger area than the force in **(a)**.

State whether the pressure on this hand is greater than, the same as or less than the pressure on the fingers holding the string.

[1 mark]

Question 5c

State the energy store of the bow that energy is transferred into when the archer bends it as shown in Fig. 3.1.

[1 mark]