

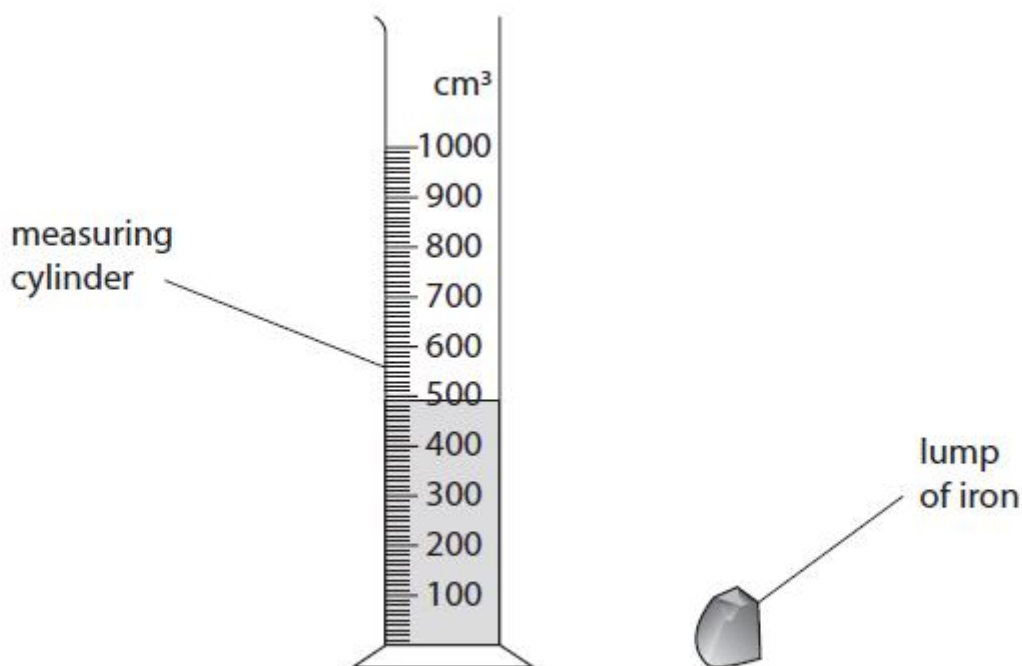
Name of the Student: \_\_\_\_\_

Max. Marks : 17 Marks

Time : 17 Minutes

Q1.

Figure 21 shows some water in a measuring cylinder and a lump of iron.



**Figure 21**

The lump of iron is lowered fully into the water.

The water level in the measuring cylinder rises to 530 cm<sup>3</sup>.

The density of iron is 7.9 g / cm<sup>3</sup>.

Calculate the mass of the lump of iron.

Use the equation

$$\text{density} = \frac{\text{mass}}{\text{volume}}$$

Give your answer to 2 significant figures.

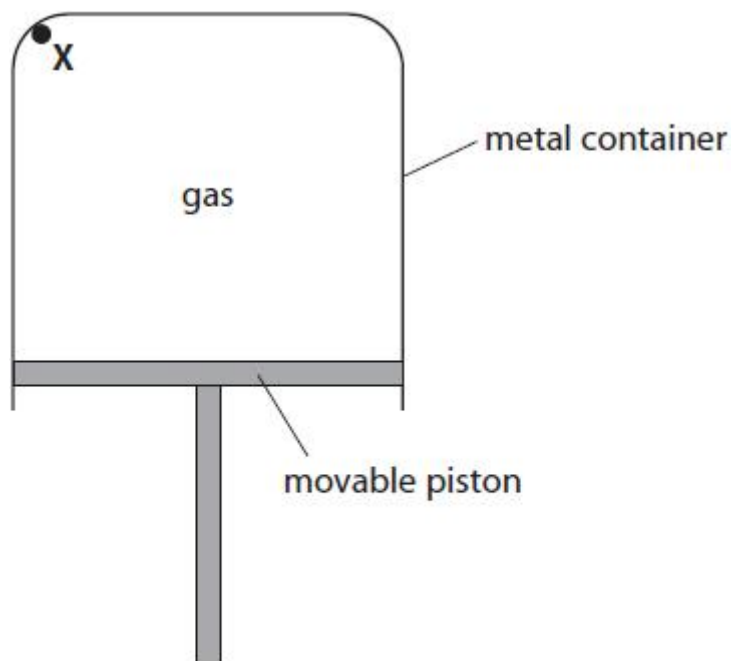
(4)

mass = ..... g

**(Total for question = 4 marks)**

Q2.

Figure 16 shows a metal container with a movable piston.



**Figure 16**

Point X is on the inner surface of the container.

The gas in the container is at a higher pressure than the air outside the container.

The pressure of the gas in Figure 16 ( $P_1$ ) is 120 kPa.

The volume of the gas in Figure 16 ( $V_1$ ) is 2500 cm<sup>3</sup>.

The piston is pushed up slowly so that the temperature of the gas does not change.

The new volume of the gas ( $V_2$ ) is 1600 cm<sup>3</sup>.

Calculate the new pressure of the gas,  $P_2$ .

Use the equation

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

(2)

new pressure,  $P_2 = \dots\dots\dots$  kPa

**(Total for question = 2 marks)**

Q3.

A fixed mass of helium gas is compressed into a container, with no change in temperature.

The table in Figure 7 shows the pressure  $P_1$  and volume  $V_1$  before the gas is compressed, and the volume  $V_2$  after the gas is compressed.

	pressure in kPa	volume in $\text{m}^3$
before the gas is compressed	$P_1 = 105$	$V_1 = 2.3$
after the gas is compressed	$P_2 =$	$V_2 = 0.20$

**Figure 7**

(i) Calculate the pressure  $P_2$  after the gas is compressed.

(2)

Use the equation

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

pressure  $P_2 =$  ..... kPa

(ii) A shop sells the container of helium gas shown in Figure 8.

The container of helium gas can be used to fill party balloons.



**Figure 8**

A filled party balloon has a volume of  $0.07 \text{ m}^3$  at a pressure of  $105 \text{ kPa}$ .

The shop claims that you can fill at least 30 party balloons using the gas from the container.

Comment on the shop's claim.

Use information about the volume of the gas at a pressure of  $105 \text{ kPa}$  as shown in the table in Figure 7.

(3)

.....

.....

.....

.....

**(Total for question = 5 marks)**

Q4.

Figure 8 shows a small container of carbon dioxide at high pressure.

The pressure,  $P_1$ , in the container is 8.00 MPa.

The volume,  $V_1$ , of the container is 14.5 cm<sup>3</sup>.



**Figure 8**

The container is pierced and all of the carbon dioxide goes into a large balloon.

The volume of gas,  $V_2$ , in the large balloon is 1160 cm<sup>3</sup>.

Calculate the pressure,  $P_2$ , in the large balloon.

Use the equation

$$P_1V_1 = P_2V_2$$

(3)

pressure in the large balloon = ..... MPa

**(Total for question = 3 marks)**

Q5.

An electric kettle is used to boil some water.

While the water is boiling, 566 000 J of thermal energy turns 0.250 kg of water into steam.

Calculate the specific latent heat of vaporisation of water.

Use an equation selected from the list of equations at the end of this paper.

(3)

specific latent heat = ..... J/kg

**(Total for question = 3 marks)**