

Name of the Student: _____

Max. Marks : 17 Marks

Time : 17 Minutes

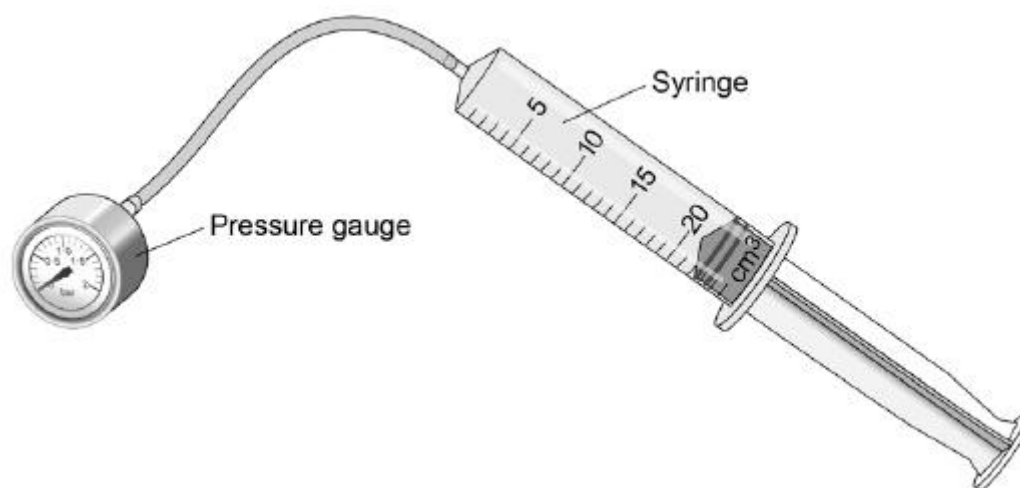
Q1.

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



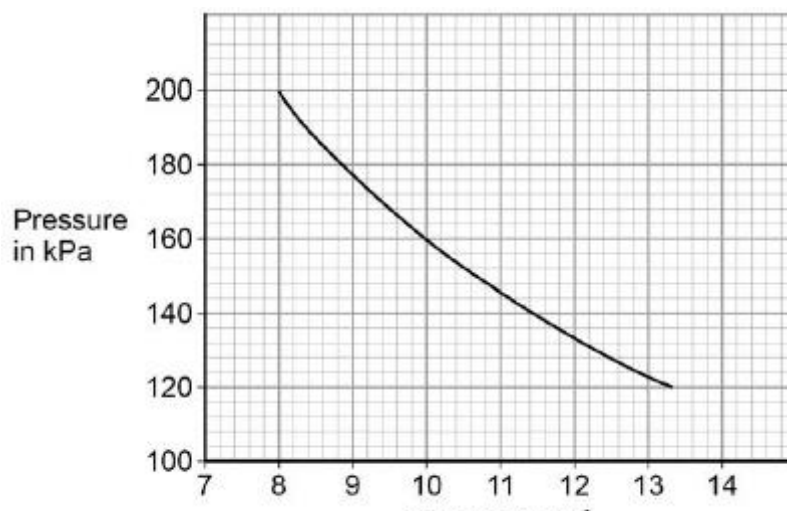
(a) What is the resolution of the syringe?

_____ cm³ (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.

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)

Q2.

The diagram below shows a wind turbine.



- (a) At a particular wind speed, a volume of $2.3 \times 10^4 \text{ m}^3$ of air passes the blades each second.

The density of air is 1.2 kg/m^3 .

Calculate the mass of air passing the blades per second.

Mass of air per second = _____ kg

(3)

- (b) The power output of the turbine is directly proportional to the kinetic energy of the air passing the blades each second.

Describe the effect on the power output when the wind speed is halved.

(3)

- (c) At a different wind speed, the wind turbine has a power output of 388 kW.

The mass of air passing the wind turbine each second is 13 800 kg.

Calculate the speed of the air passing the blades each second.

Assume that the process is 100% efficient.

Speed of air = _____ m/s

(3)

(Total 9 marks)