OCR (B) Physics A-level

PAG 08.3 - Estimating the Work Done by a Gas when Temperature Increases

Practical Flashcards

How does the volume of a gas change when its temperature increases at constant pressure?

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As temperature increases, the volume of the gas will also increase. The two quantities are directly proportional to each other.

State the value of the standard atmospheric pressure.

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101 kPa

State Charles' Law.

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When kept at a constant pressure, the absolute temperature and volume of a gas are directly proportional.

$$V/T = \text{Constant}$$

How would you go about measuring the cross-sectional area of the inside of a syringe?

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Remove the plunger and then, using a micrometer, measure the diameter of the seal. This value can then be substituted into the circular area equation.

Why should the clip used to seal the tubing, coming from the syringe, be as close to the syringe tip as possible?

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The volume of air trapped in the tubing should be as small as possible so that it is negligible in comparison to the volume in the syringe.

Suggest how a mass hanger could be attached to the plunger of the syringe.

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A small piece of string can be tied to the plunger to form a loop. The hanger can then hook onto this loop.

How can the force exerted by the masses be calculated?

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$$F = mg$$

Force = Mass x Gravitational Field Strength

How can the pressure exerted by the masses on the air sample be calculated?

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Pressure = Force / Cross-Sectional Area of Plunger

This pressure should then be subtracted from the standard atmospheric pressure.

What equation is used to calculate the work done by a gas as it expands?

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Work Done = Pressure x Change in Volume

$$W = p\Delta V$$

What safety precautions should be taken when working with a hot beaker of water?

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Avoid touching the hot beaker with bare hands, and ensure it is handled with care to avoid spillages. A heatproof mat should be used to protect the bench.

What should you do before recording each measurement of water temperature?

What should you do before recording each measurement of water temperature?

You should always stir the water before taking a temperature measurement so that the reading is an appropriate and accurate reflection of the average temperature of the water in the beaker.