OCR (A) Physics A-level

PAG 02.3 - Investigating a Property of a Plastic

Practical Flashcards

What is the disadvantage of cutting a hole to hang the plastic from?

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Adding a hole to the plastic will result in a stress concentration when it is loaded. This means that the stress isn't evenly distributed throughout the plastic.

What is breaking stress?

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The breaking stress is the stress at which the material will break apart.

How can the work done to permanently deform a material be obtained?

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The work done to permanently deform a material sample is given by the area between the loading and unloading lines on a load-extension graph.

What is a plastic deformation?

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A plastic deformation is one where the object will remain permanently deformed when the deforming forces are removed.

What is the elastic limit?

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The elastic limit is the point beyond which the sample no longer deforms elastically, and so no longer returns to its original shape when the deforming forces are removed. Beyond this point, plastic deformation occurs.

How can the data to plot an unloading line be obtained?

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The masses can be removed one-by-one and the extension measured each time.

Why will the load-extension graph not be a straight line graph for this experiment?

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Plastics do not deform elastically and so don't obey Hooke's law. The samples will deform plastically and will produce a curved graph.

How can the force applied by a mass be calculated?

How can the force applied by a mass be calculated?

The force will equal the weight of the mass:

$$F = mg$$

How do you calculate a sample's extension?

How do you calculate a sample's extension?

Extension = Extended Length - Original Length

What safety precautions should be taken when carrying out this experiment?

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Ensure that the masses are hanging over the workbench. Place padding beneath them so that they don't bounce and cause injury when they fall.

How should the length measurements be taken?

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The length measurements should be taken from the same point each time. A ruler can be used, and when taking the measurements, it should be read at eye-level to reduce parallax error.