

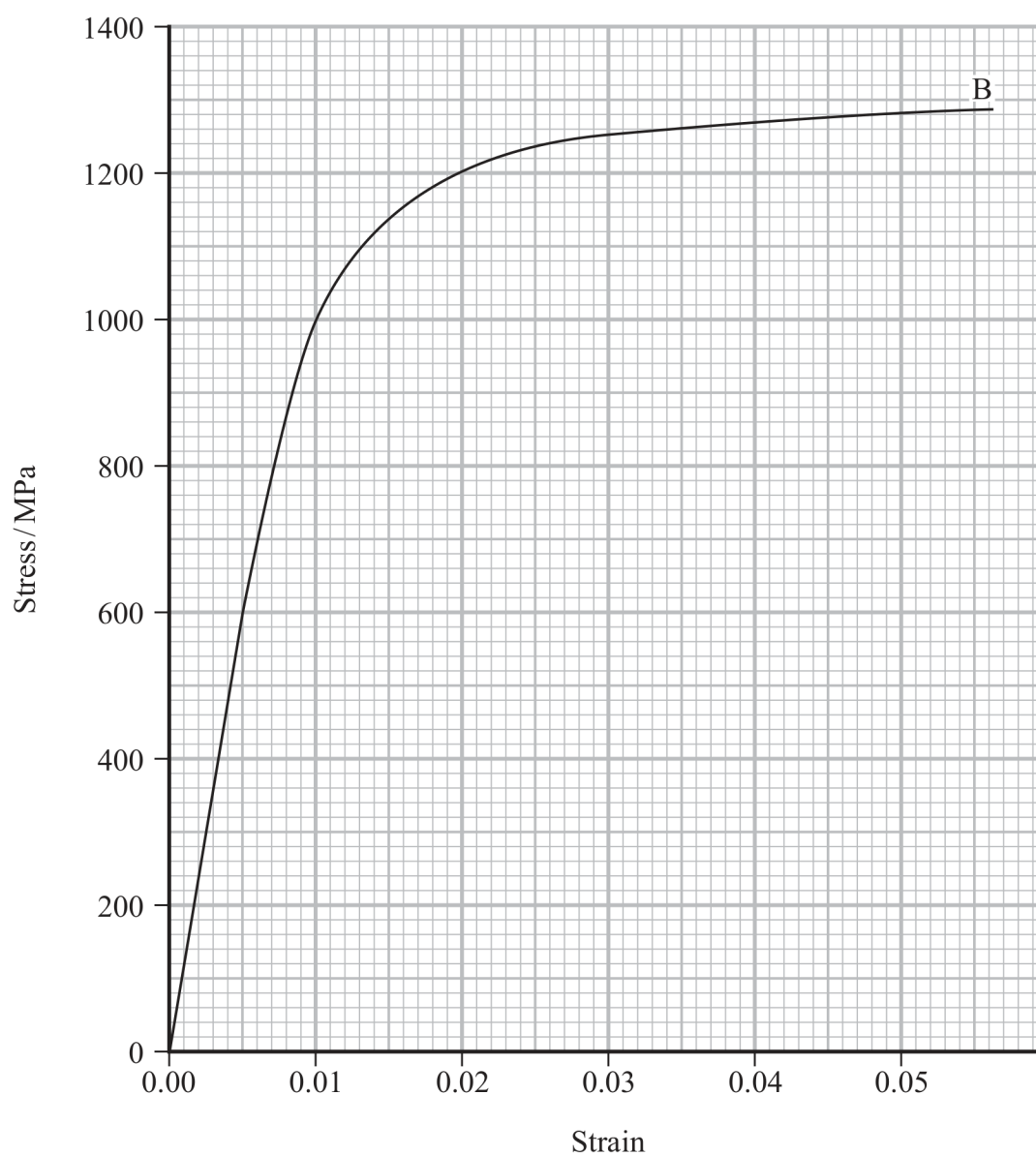
16 A steadily increasing tensile force was applied to a sample of a titanium alloy.

The sample had an original length of 40.0 cm and diameter of 5.05 mm.

(a) State a suitable measuring instrument to measure the diameter of the sample.

(1)

(b) The graph shows how stress varied with strain for the sample.



(i) Determine the Young modulus of the sample.

(3)

Young modulus =

(ii) The sample broke at point B.

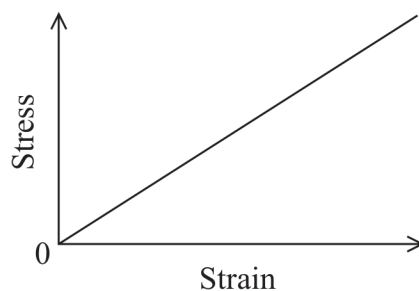
Determine the force required to break the sample.

(4)

Force =



(iii) The graph below shows a linear section of the stress-strain graph for the sample.



Show that the area under this graph represents the work done per unit volume in stretching the sample.

(3)

(iv) The area under any stress-strain graph represents the work done per unit volume.

Estimate the amount of work required to break the titanium alloy sample.

(4)

Work =

(Total for Question 16 = 15 marks)

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