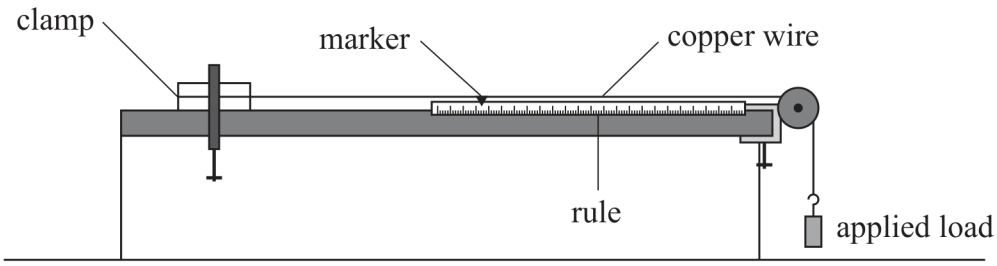
16 A student carried out an experiment to determine the Young modulus of copper. She used the apparatus below to observe the position of a marker as a copper wire extended under increasing applied loads.



(a) Describe how the diameter of the wire should have been determined.

(3)

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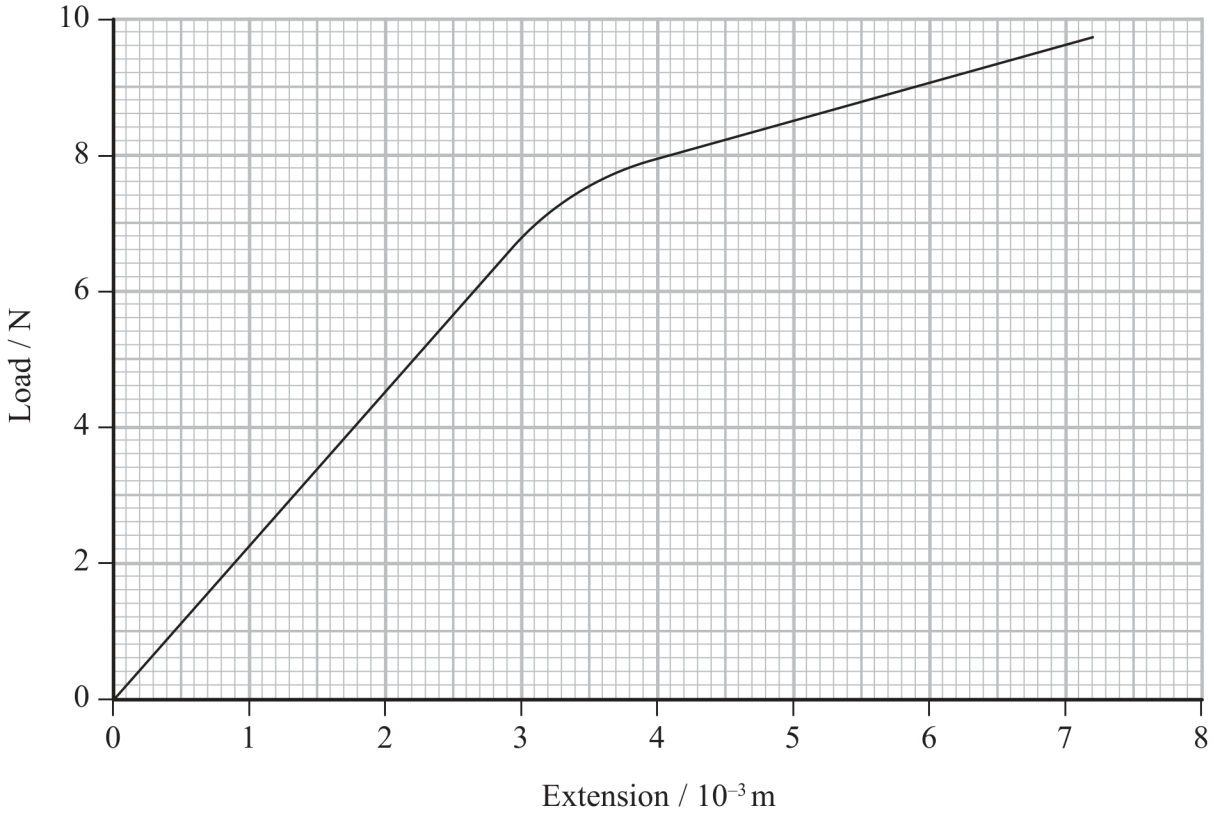
(b) The student calculated the extension of the copper wire for each applied load. She then plotted a graph of load against extension.



Determine a value for the Young modulus of copper.

original length of copper wire = 2.4 m
diameter of copper wire = 2.3×10^{-4} m

(4)

Young modulus of copper = ...

*(c) Explain why the sample of wire used in this experiment should be long and thin.

(6)

(Total for Question 16 = 13 marks)