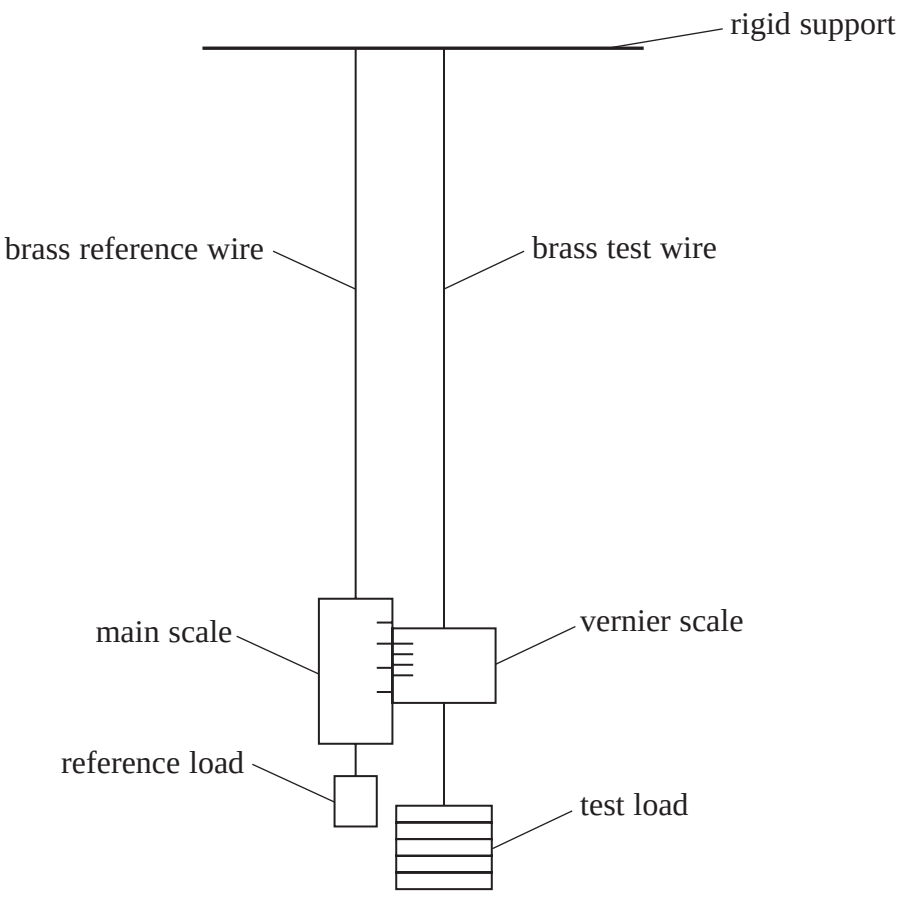
**5** A student used the apparatus shown to determine the Young modulus of brass. Loads were added to the test wire and corresponding readings taken from the vernier scale. The test wire and the reference wire were identical.




(a) (i) Give one advantage of using a reference wire as well as a test wire.

**(1)**

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(ii) State why a reference load was applied to the reference wire.

**(1)**

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(b) Explain why the test wire should be both long and thin.

**(3)**

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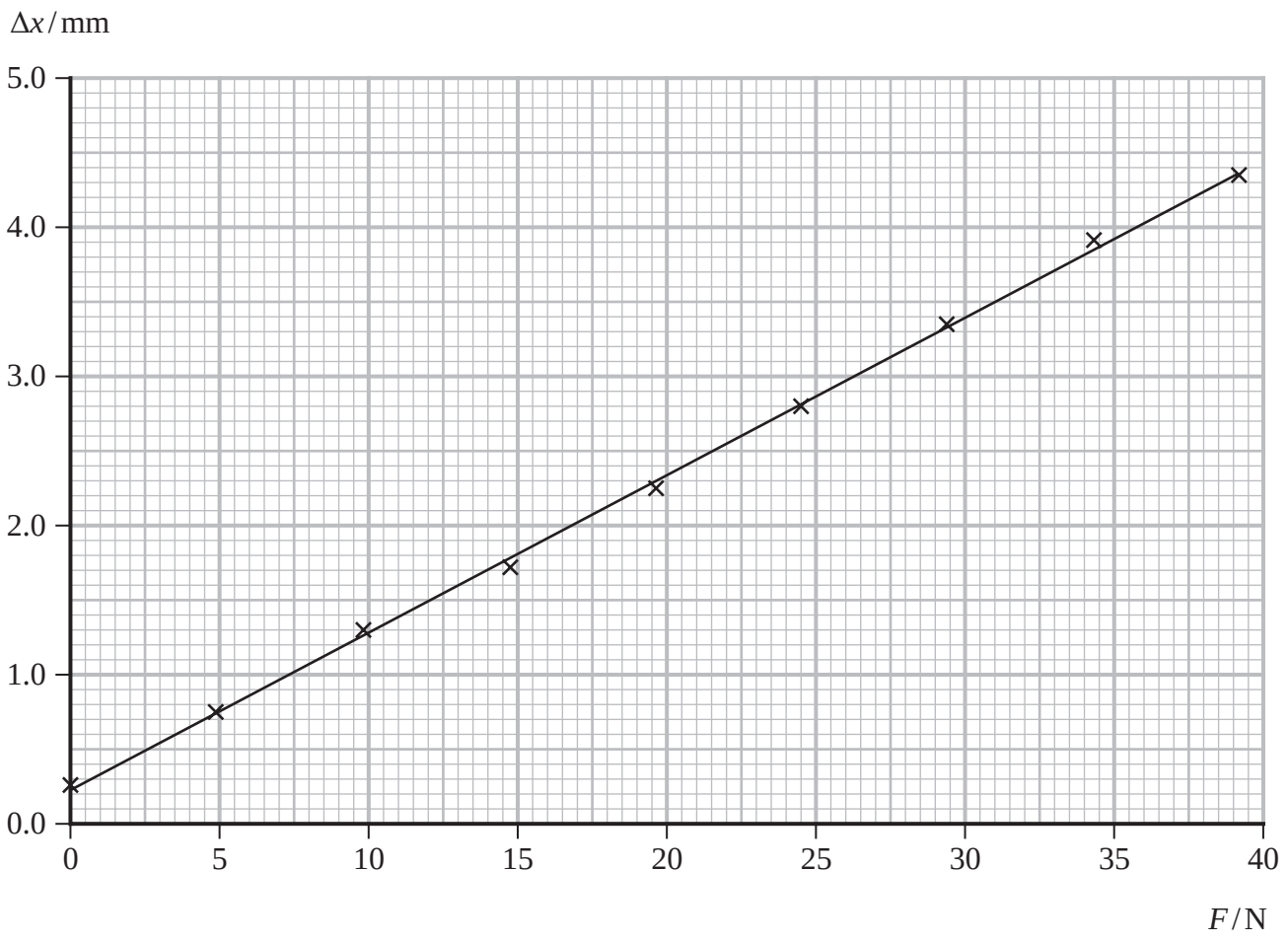
(c) The student varied the load $F$ on the test wire and recorded the corresponding change in length $\Delta x$ from the vernier scale. The results are shown on the graph.




Determine a value for the Young modulus of brass.

length of wire = 2.75 m
diameter of wire = $5.60 \times 10^{-4}$ m

**(5)**

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Young modulus of brass = .....

**(Total for Question 5 = 10 marks)**