OCR
Oxford Cambridge and RSA

A level Physics B

H557/03 Practical skills in physics

Question Set 8

1 (a) This question is about an experiment to determine the Young modulus of a copper wire.

The diameter *D* of the wire was measured using a micrometer screw gauge in several places along the length of the wire. The values obtained are shown in the dot-plot shown in **Fig. 1.1**. Each dot represents one reading.

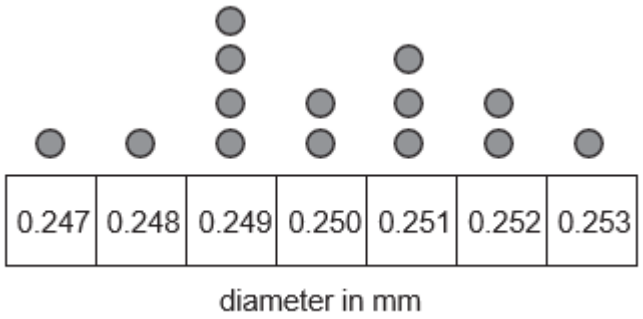

Fig.1.1

(i) Use the information in the dot-plot to find the mean *D*. Use the spread to determine the percentage uncertainty.

mean *D* = ... mm ±.....%

[3]

(ii) Calculate the cross-sectional area *A* of the wire and include the uncertainty.

A ..... ±.....m^2 **[3]**

(b) **(i)** A marker is placed to give an original length of the wire as 4.00 ± 0.02 m.
Fig. 1.2 shows the extension x of a metal wire at different applied loads F. x is measured to ± 0.5 mm and F is measured to ± 0.2 N. **Fig. 1.2** shows the force-extension graph for the wire.

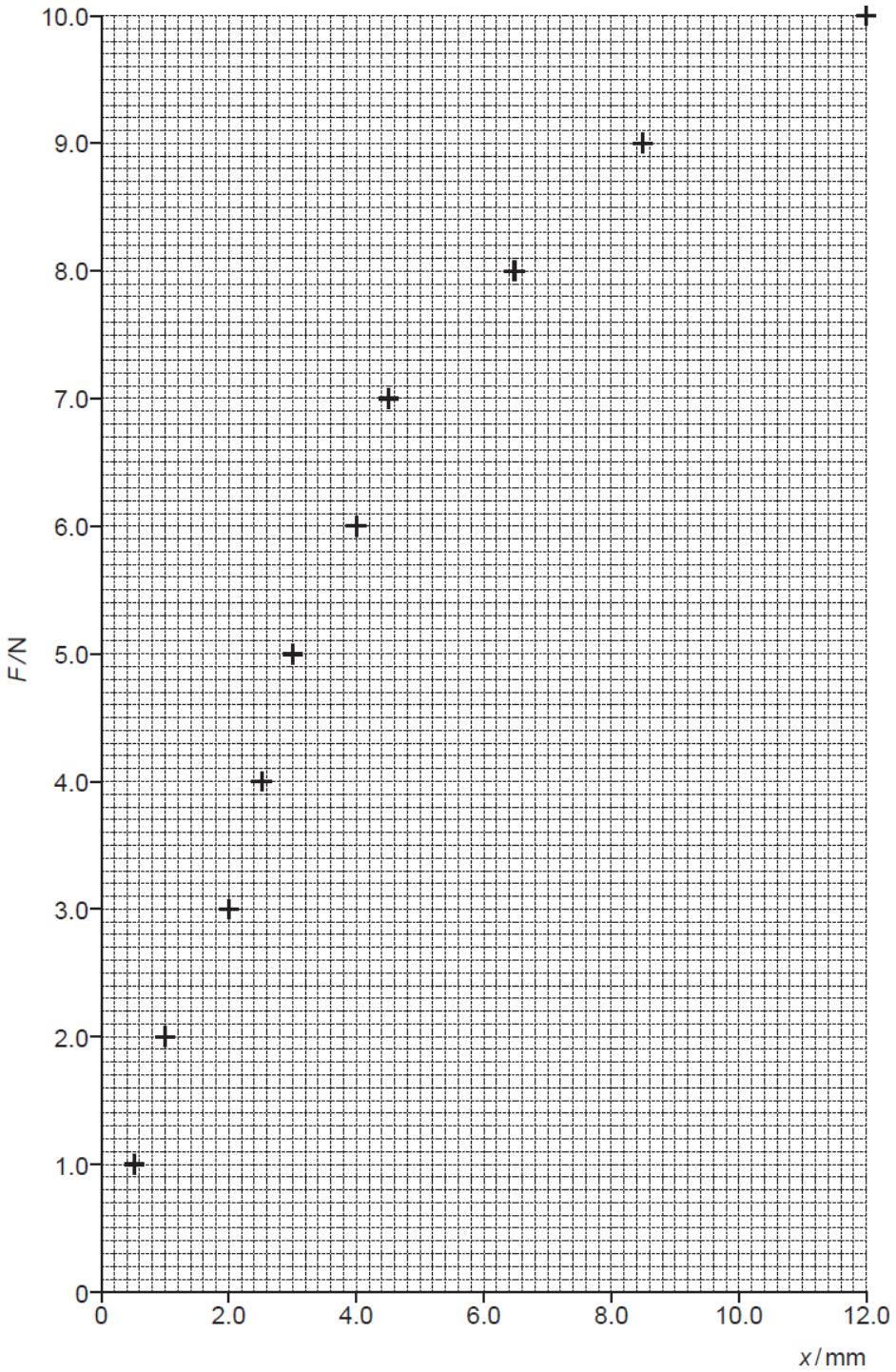

Fig. 1.2

On **Fig. 1.2**

1 complete vertical and horizontal error bars on each of the plots
2 label the regions of elastic and plastic deformation
3 draw a line of best fit through the straight section of the graph.

[4]

(ii) Use the graph and the data given to calculate the value of the Young Modulus *E*. Include the appropriate unit.

E = …… unit ……

[5]

(c)* Use **Fig. 1.2** and your answer to part **(b)(ii)** to estimate the percentage uncertainty in the calculated value of the Young Modulus and describe the main sources of error in the experiment. Suggest and explain possible improvements to the experiment.

[6]

Total Marks for Question Set 8: 21