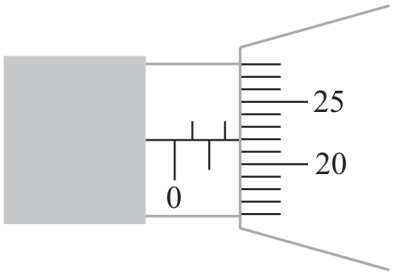
Answer ALL questions.

1 A student made measurements of the ruler shown.

(Source: © Dragance137/Shutterstock)

(a) She used a micrometer screw gauge to measure the thickness t at the centre of the ruler.

The diagram below shows the reading on the micrometer.



(i) State the value of t shown on the micrometer.

(1)

t = ...

(ii) Determine the percentage uncertainty in this value of t.

(2)

.....

.....

.....

Percentage uncertainty in t = ...

DO NOT WRITE IN THIS AREA

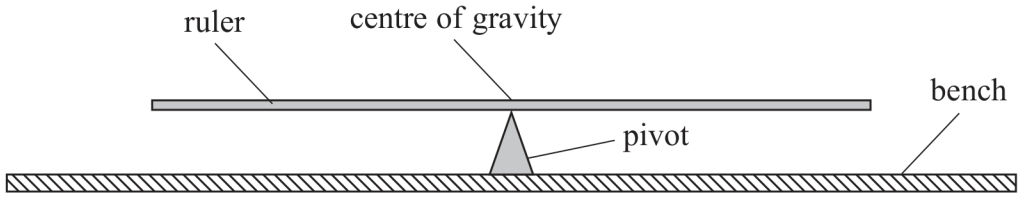
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(iii) Explain how she should reduce a source of error in this measurement of t.

(2)

(b) The student balanced the ruler on a pivot as shown, and recorded the position of the centre of gravity of the ruler.



The student has a 20 g mass.

Describe how the student should determine an accurate value for the mass of the ruler using the 20 g mass and the apparatus shown.

(4)

(Total for Question 1 = 9 marks)