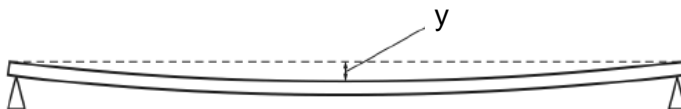


- 3 A ruler is supported horizontally by two pivots as shown.



The vertical displacement  $y$  at the centre of the ruler can be used to measure the mass loaded on it and is given by the equation

$$y = \frac{kML^3}{wt^3}$$

where

$k$  is a constant,

$L$  is the distance between the pivots,

$M$  is the mass loaded onto the ruler,

$t$  is the thickness of the ruler and

$w$  is the width of the ruler.

When a particular  $M$  is loaded onto the ruler, the following results are obtained:

$$y = (0.25 \pm 0.01) \text{ mm}$$

$$L = (80.0 \pm 0.2) \text{ cm}$$

$$t = (6.0 \pm 0.1) \text{ mm}$$

$$w = (23.0 \pm 0.5) \text{ mm}$$

Which measurement contributes the most to the uncertainty of  $M$ ?

**A**  $y$

**B**  $L$

**C**  $t$

**D**  $w$