

Section A

Answer **all** the questions in the spaces provided.

- 1 A light wooden metre rule of thickness t and width w is placed horizontally on two supports a distance L apart.

An object of mass M is suspended from the midpoint of the rule and the rule bends by a distance x , as shown in Fig. 1.1.

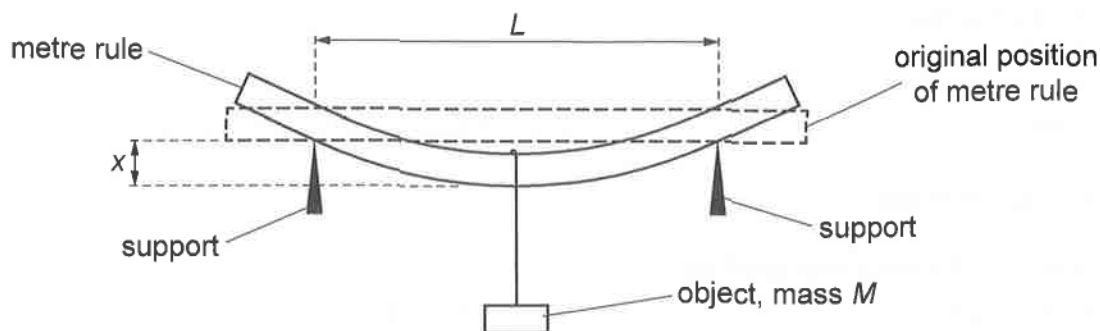


Fig. 1.1

The amount of bending x of the metre rule is related to the mass M of the object by the equation:

$$x = \frac{L^3 g M}{4 w t^3 E}$$

where E is a constant measured in Pa and g is the gravitational field strength.

- (a) Use SI base units to show that this equation is homogenous.

[3]



(b) Data for Fig. 1.1 is given in Table 1.1.

Table 1.1

w/cm	2.10 ± 0.02
t/mm	4.56 ± 0.01
L/m	0.800 ± 0.005
M/g	300 ± 2
x/cm	1.00 ± 0.01

Use this data to calculate E and the percentage uncertainty in its value.

$$E = \dots\dots\dots \text{Pa} \pm \dots\dots\% \quad [4]$$

[Total: 7]

