

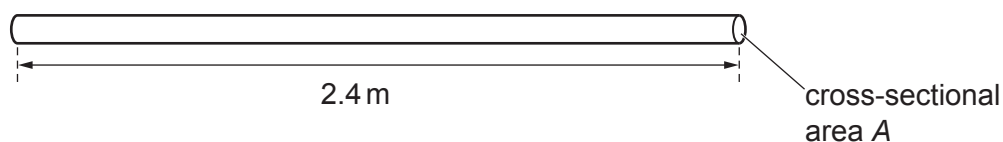
- 1 (a) (i) Define the *moment* of a force about a point.

.....  
..... [1]

- (ii) Determine the SI base units of the moment of a force.

base units ..... [1]

- (b) A uniform rigid rod of length 2.4 m is shown in Fig. 1.1.



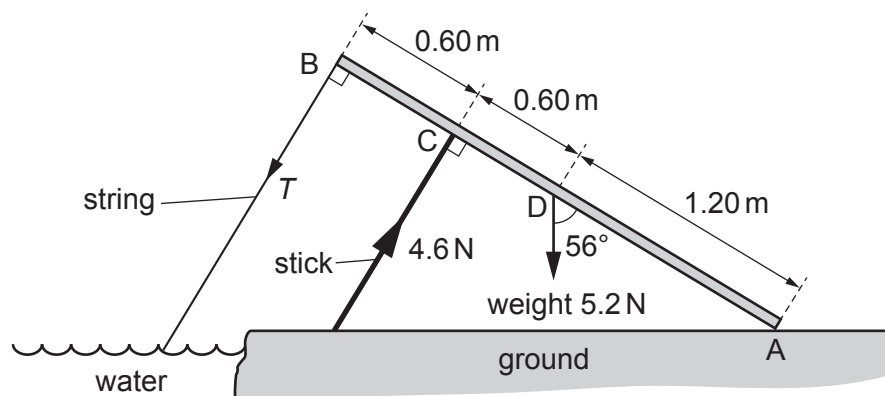
**Fig. 1.1**

The rod has a weight of 5.2 N and is made of wood of density  $790 \text{ kg m}^{-3}$ .

Calculate the cross-sectional area  $A$ , in  $\text{mm}^2$ , of the rod.

$A = \dots\dots\dots \text{mm}^2$  [3]

- (c) A fishing rod AB, made from the rod in (b), is shown in Fig. 1.2.



**Fig. 1.2** (not to scale)

End A of the rod rests on the ground and a string is attached to the other end B. A support stick exerts a force perpendicular to the rod at point C. The weight of the rod acts at point D.

The tension  $T$  in the string is in a direction perpendicular to the rod. The rod is in equilibrium and inclined at an angle of  $56^\circ$  to the vertical.

The forces and the distances along the rod of points A, B, C and D are shown in Fig. 1.2.

- (i) Show that the component of the weight that is perpendicular to the rod is  $4.3\text{ N}$ .

[1]

- (ii) By taking moments about end A of the rod, calculate the tension  $T$ .

$$T = \dots\dots\dots \text{ N [3]}$$

[Total: 9]