

**AS Level Physics A**  
**H156/02** Depth in physics

**Question Set 10**

1. An engineer is investigating the tension in a steel cable supporting a uniform wooden plank as shown in Fig. 4.

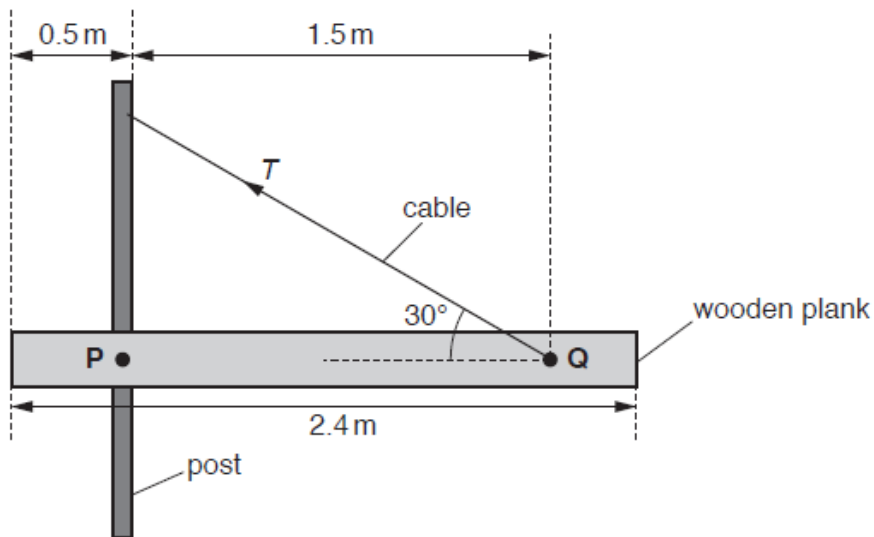


Fig. 4 (not to scale)

The plank is 2.4 m long and has a mass of 50 kg. It is pivoted at point P to a vertical post. The cable is fixed to the plank at point Q and to the vertical post as shown in Fig. 4. The cable is at an angle of 30° to the plank. The plank is in equilibrium and resting in a horizontal position.

- (a) Show that the tension  $T$  in the cable is about 460 N.

[4]

- (b) The original length of the steel cable is 1.73 m and it has a cross-sectional area of 11.0 mm<sup>2</sup>.

The Young modulus of steel is 210 GPa.

Calculate the extension  $x$  of the cable shown in Fig. 4.

$x = \dots\dots\dots$  m

[3]

**Total Marks for Question Set 10: 7**

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