Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

4 Forces

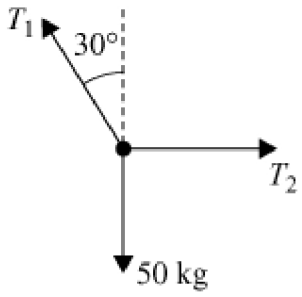
Exercise E, Question 16

Question:

A load of mass 50 kg is supported, in equilibrium, by two ropes. One is at an angle of 30° to the vertical and the other is horizontal, as shown in the diagram. The tensions in these ropes are T_1 newtons and T_2 newtons, respectively.

(a) Show that $T_1 = 566$ N, correct to three significant figures.

(b) Find T_2. [A]



Solution:

(a) Resolving vertically

$$T_1 \cos 30° = 490$$

$$\therefore T_1 = \frac{490}{\cos 30°} = 565.80...$$

i.e. $T_1 = 566$ N (3 s.f.)

(b) Resolving horizontally

$$T_2 = T_1 \sin 30°$$

$$T_2 = 565.80... \times \sin 30°$$

$$T_2 = 282.90...$$

i.e. $T_2 = 283$ N (3 s.f.)