1.

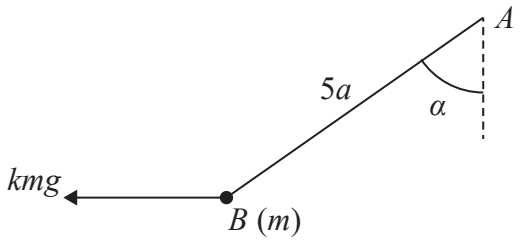


Figure 1

A light elastic string AB has natural length $4a$ and modulus of elasticity λ.
The end A is attached to a fixed point and the end B is attached to a particle of mass m.
The particle is held in equilibrium, with the string stretched, by a horizontal force of magnitude kmg.
The line of action of the horizontal force lies in the vertical plane containing the elastic string.

The string AB makes an angle α with the vertical, where $\tan\alpha = \frac{4}{3}$

With the particle in this position, $AB = 5a$, as shown in Figure 1.

(a) Show that $\lambda = \frac{20mg}{3}$

(4)

(b) Find the value of k.

(4)

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Question 1 continued

(Total for Question 1 is 8 marks)