5.

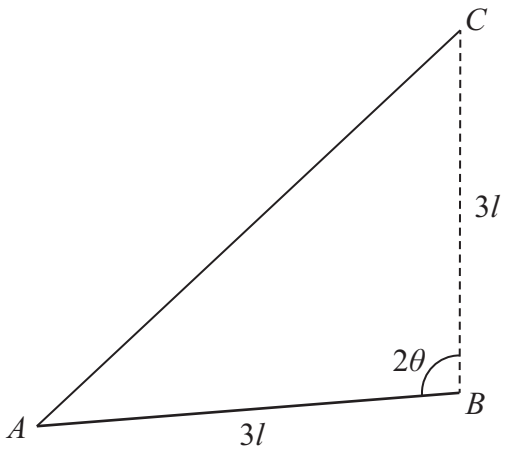


Figure 3

A uniform rod AB has mass M and length $3l$
The rod is free to move in a vertical plane about a fixed smooth horizontal axis through B

One end of a light elastic string, of natural length $2l$ and modulus of elasticity $\frac{5Mg}{8}$, is attached to the rod at A

The other end of the string is attached to the fixed point C, which is at a distance $3l$ vertically above B, as shown in Figure 3.

The rod is resting in equilibrium with angle $ABC = 2\theta$, where $0 < \theta < \frac{1}{2}\pi$

By taking moments about the horizontal axis through B, show that the extension of the string is $\frac{16}{7}l$

(7)

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