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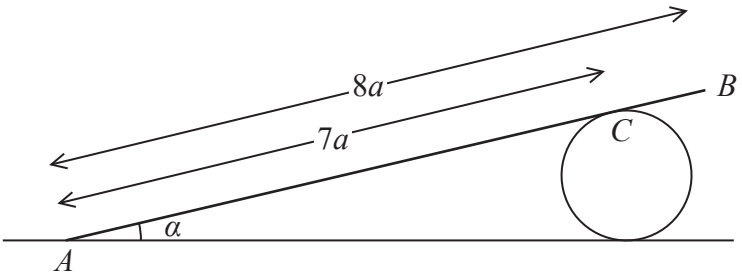


Figure 4

A uniform rod, AB, of weight W and length $8a$, rests in equilibrium with the end A on rough horizontal ground. The rod rests on a smooth cylinder. The cylinder is fixed to the ground with its axis horizontal. The point of contact between the rod and the cylinder is C, where $AC = 7a$, as shown in Figure 4. The rod is resting in a vertical plane that is perpendicular to the axis of the cylinder. The rod makes an angle α with the horizontal.

(a) Show that the normal reaction of the ground on the rod at A has magnitude $W\left(1 - \frac{4}{7}\cos^2\alpha\right)$

(6)

Given that the coefficient of friction between the rod and the ground is μ and that $\cos\alpha = \frac{3}{\sqrt{10}}$

(b) find the range of possible values of μ.

(5)

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