6.

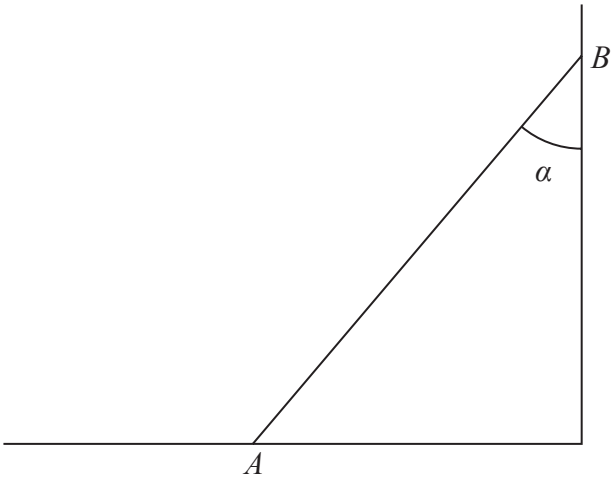


Figure 2

A uniform rod, AB, of mass m and length $2a$, rests in limiting equilibrium with its end A on rough horizontal ground and its end B against a smooth vertical wall.
The vertical plane containing the rod is at right angles to the wall.
The rod is inclined to the wall at an angle α, as shown in Figure 2.

The coefficient of friction between the rod and the ground is $\frac{1}{3}$

(a) Show that $\tan\alpha = \frac{2}{3}$

(6)

With the rod in the same position, a horizontal force of magnitude kmg is applied to the rod at A, towards the wall. The line of action of this force is at right angles to the wall.

The rod remains in equilibrium.

(b) Find the largest possible value of k.

(4)

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Question 6 continued

(Total for Question 6 is 10 marks)