6.

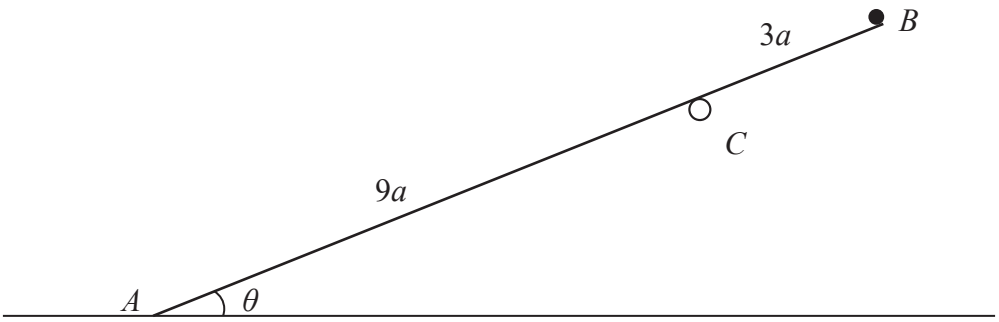


Figure 5

A uniform beam AB, of weight $5W$ and length $12a$, rests with end A on rough horizontal ground.
A package of weight W is attached to the beam at B.
The beam rests in equilibrium on a smooth horizontal peg at C, with $AC = 9a$, as shown in Figure 5.
The beam is inclined at an angle θ to the ground, where $\tan\theta = \frac{5}{12}$

The beam is modelled as a rod that lies in a vertical plane perpendicular to the peg.
The package is modelled as a particle.

The normal reaction between the beam and the peg at C has magnitude kW

Using the model,

(a) show that $k = \frac{56}{13}$

(4)

The coefficient of friction between A and the ground is μ

Given that the beam is resting in limiting equilibrium,

(b) find the value of μ

(6)

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Question 6 continued

(Total for Question 6 is 10 marks)