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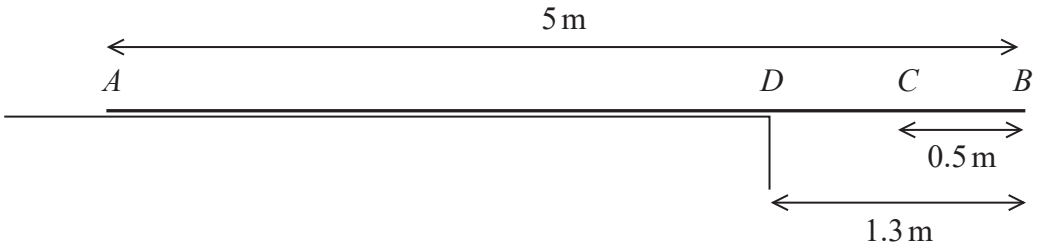


Figure 2

A beam $ADCB$ has length 5 m. The beam lies on a horizontal step with the end A on the step and the end B projecting over the edge of the step. The edge of the step is at the point D where $DB = 1.3$ m, as shown in Figure 2.

When a small boy of mass 30 kg stands on the beam at C, where $CB = 0.5$ m, the beam is on the point of tilting.

The boy is modelled as a particle and the beam is modelled as a uniform rod.

(a) Find the mass of the beam.

(3)

A block of mass X kg is now placed on the beam at A.

The block is modelled as a particle.

(b) Find the smallest value of X that will enable the boy to stand on the beam at B without the beam tilting.

(3)

(c) State how you have used the modelling assumption that the block is a particle in your calculations.

(1)

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Q3

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