4.

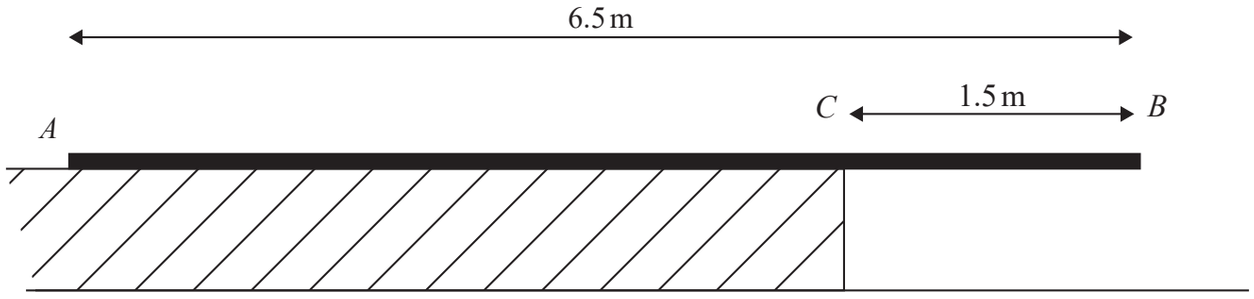

Figure 2

A non-uniform rod AB has length 6.5 m and mass 1.2 kg. The centre of mass of the rod is 3 m from A. The rod rests on a horizontal step and overhangs the end of the step C by 1.5 m, as shown in Figure 2.

The rod is perpendicular to the edge of the step.

A particle of mass 4 kg is placed on the rod at B and another particle, whose mass is M kg, is placed on the rod at D, where $AD = 0.5$ m.

The rod remains in equilibrium in a horizontal position.

(a) Find the smallest possible value of M.

(3)

The particle at B **and** the particle at D are now **removed**.

A new particle is placed on the rod at the point E, where $EB = 0.9$ m.

The rod remains in equilibrium in a horizontal position but is on the point of tilting about C.

(b) Find the magnitude of the force acting on the rod at C.

(3)

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