4.

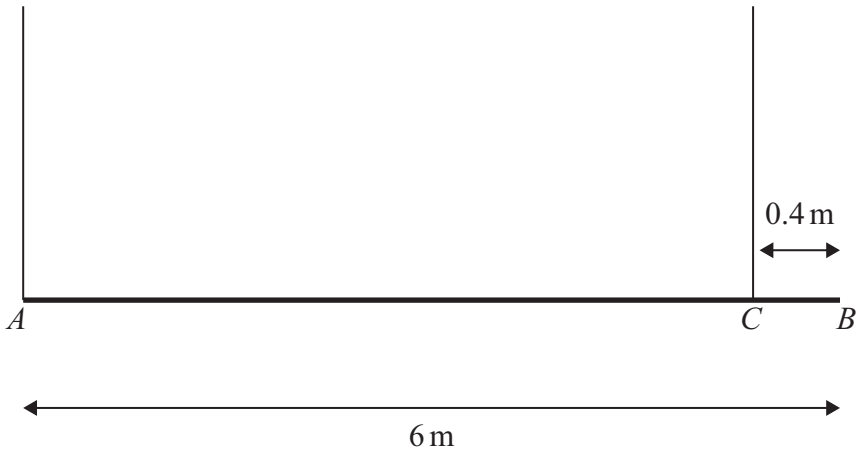


Figure 2

Figure 2 shows a uniform rod AB of length 6 m suspended by two light vertical ropes.

The first rope is attached to the rod at A.
The second rope is attached to the rod at the point C, where $CB = 0.4$ m.

The rod has mass 30 kg.

A particle of mass 20 kg is now attached to the rod at B.

The rod is in equilibrium in a horizontal position.

(a) Find

(i) the tension in the rope attached to the rod at C,
(ii) the tension in the rope attached to the rod at A.

(6)

The particle of mass 20 kg at B is removed and replaced by a particle of mass M kg.

The rod remains in equilibrium in a horizontal position.

(b) Find the exact maximum value of M.

(3)

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Question 4 continued

(Total for Question 4 is 9 marks)