6. A particle P of mass 1.2 kg is attached to the midpoint of a light elastic string of natural length 0.5 m and modulus of elasticity λ newtons.

The fixed points A and B are 0.8 m apart on a horizontal ceiling. One end of the string is attached to A and the other end of the string is attached to B.

Initially P is held at rest at the midpoint M of the line AB and the tension in the string is 30 N.

(a) Show that $\lambda = 50$

(3)

The particle is now held at rest at the point C, where C is 0.3 m vertically below M. The particle is released from rest.

(b) Find the magnitude of the initial acceleration of P

(6)

(c) Find the speed of P at the instant immediately before it hits the ceiling.

(6)

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