2.

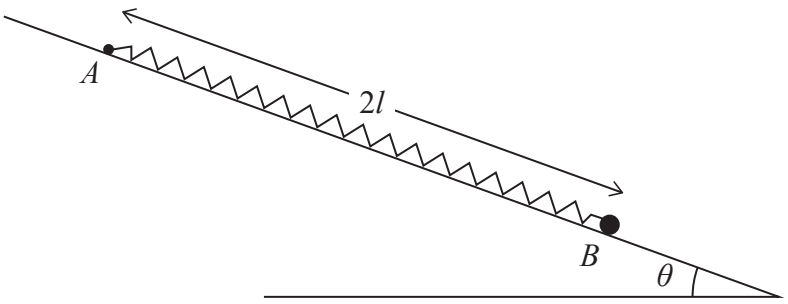


Figure 1

A light elastic **spring** has natural length l and modulus of elasticity λ
One end of the spring is attached to a point A on a smooth plane.

The plane is inclined at angle θ to the horizontal, where $\tan\theta = \frac{5}{12}$

A particle P of mass m is attached to the other end of the spring.

Initially P is held at the point B on the plane, where AB is a line of greatest slope of the plane.

The point B is lower than A and $AB = 2l$, as shown in Figure 1.

The particle is released from rest at B and first comes to instantaneous rest at the point C on AB, where $AC = 0.7l$

(a) Use the principle of conservation of mechanical energy to show that

$$\lambda = \frac{100}{91}mg$$

(5)

(b) Find the acceleration of P when it is released from rest at B.

(4)

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