3.

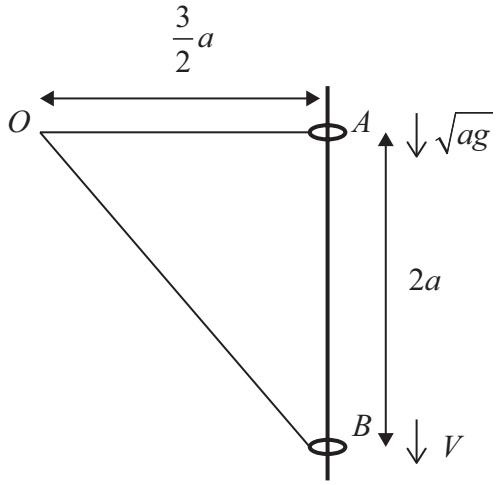


Figure 2

A light elastic string has natural length a and modulus of elasticity mg.
One end of the elastic string is attached to a fixed point O.
The other end is attached to a small smooth ring of mass m.

The ring is threaded on a fixed smooth vertical pole which is a distance $\frac{3}{2}a$ from O.

Initially, the ring is held at the point A on the pole with the elastic string horizontal.

The ring is then projected vertically downwards with speed $\sqrt{ag}$ and reaches the point B, where $AB = 2a$, with speed V, as shown in Figure 2.
Air resistance is assumed to be negligible.

Find V in terms of a and g.

(7)

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