

A particle  $P$  of mass  $m$  is attached to one end of a light elastic spring of natural length  $a$  and modulus of elasticity  $5mg$ . The other end of the spring is attached to a fixed point  $O$ . The spring hangs vertically with  $P$  below  $O$ . The particle  $P$  is pulled down vertically and released from rest when the length of the spring is  $\frac{3}{2}a$ .

Find the distance of  $P$  below  $O$  when  $P$  first comes to instantaneous rest.

[4]