7. One end of a light elastic **spring** is attached to a fixed point A
A particle of mass M is attached to the other end of the spring.

The spring has natural length $3a$ and modulus of elasticity $\frac{18Mg}{5}$

The particle is held at rest at the point B, where B is a distance $5a$ vertically below A
The particle is released from rest.
Air resistance is assumed to be negligible.

Use the **principle of conservation of mechanical energy** to

(a) find, in terms of a and g, the speed of the particle at the instant when it is a distance $3a$ vertically below A

(4)

(b) find, in terms of a, the distance of the particle below A when it first comes to instantaneous rest.

(4)

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(Total for Question 7 is 8 marks)