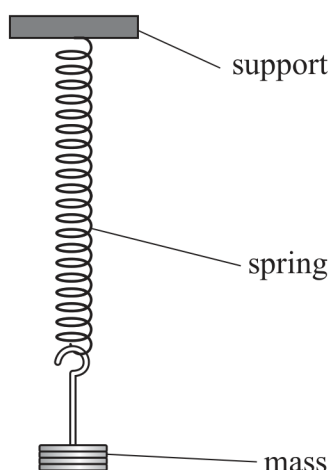**20** A mass of 250 g is hung from a spring as shown. The spring extends by 16.5 cm when the mass is added to the spring.

The mass is then displaced a further 3.5 cm vertically downwards and released. The mass oscillates with simple harmonic motion.

(a) State the conditions for a mass to undergo simple harmonic motion.

(2)

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(b) Calculate the maximum kinetic energy of the oscillating mass.
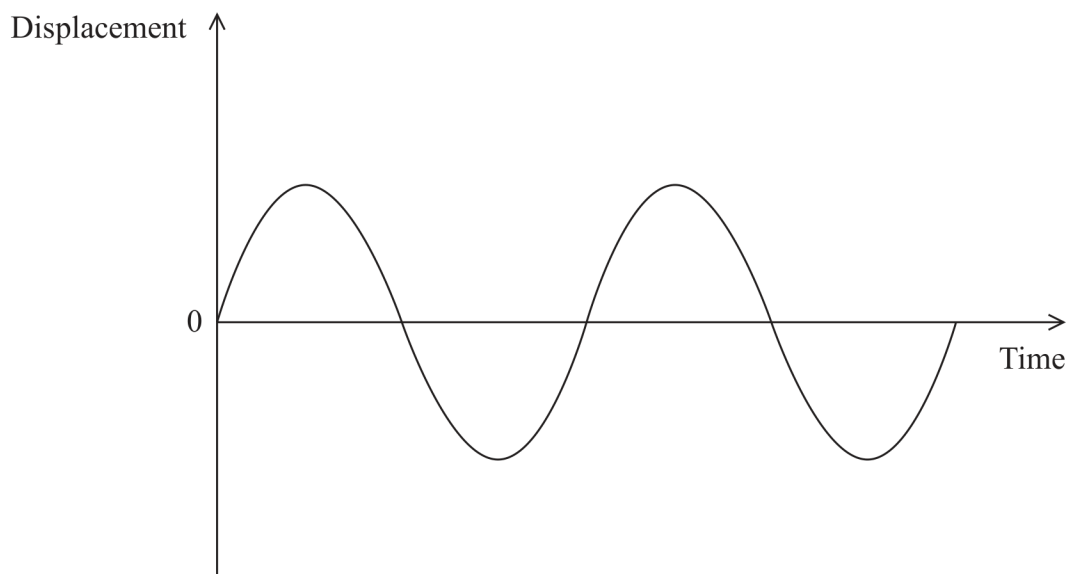
(5)

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Maximum kinetic energy = ...

(c) The graph shows how the displacement of the oscillating mass varies over two cycles.
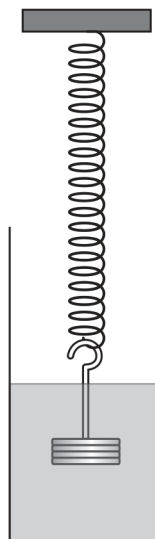
Displacement

0

Time

Add to the graph to show how the kinetic energy of the mass varies over the same time interval.

(2)

(d) The mass is submerged in water as shown.

The mass is set into oscillation as before.

Explain how the water would affect the amplitude of oscillation of the mass.

(3)

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(Total for Question 20 = 12 marks)