4 **(a)** State what is meant by *simple harmonic motion*.

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…… [2]

(b) A spring hangs vertically from a fixed point.

A mass of 1.2 kg is attached to the free end of the spring, as shown in Fig. 4.1.

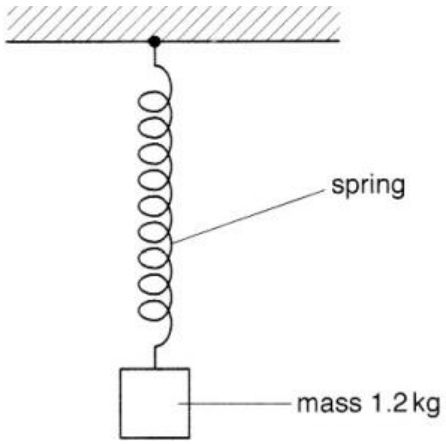

Fig. 4.1

The mass undergoes vertical simple harmonic motion with frequency 1.5 Hz and amplitude 3.4 cm.

(i) Determine the maximum resultant force on the mass.

maximum resultant force = …….. N [2]

(ii) Determine the maximum kinetic energy of the mass.

maximum kinetic energy = …….. J [2]

(c) A luggage weighing sensor measures the weight of a luggage using a spring. The luggage is hung in the same manner as how the mass in Fig. 4.1 is hung.

Suggest the advantages for the luggage weighing sensor to be **critically** damped.

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…… [2]

[Total: 8]