3   Two helical springs are attached to a trolley of mass 590 g, as shown in Fig. 3.1.
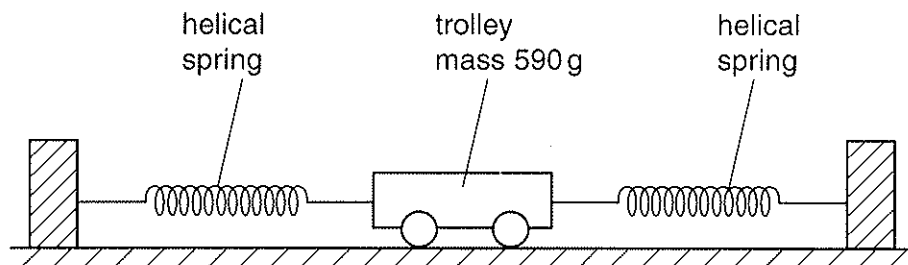
Fig. 3.1

The trolley is displaced along the axis of the springs and then released. The trolley undergoes simple harmonic motion. The variation of the kinetic energy E_K of the trolley with displacement x from its equilibrium position is shown in Fig. 3.2.
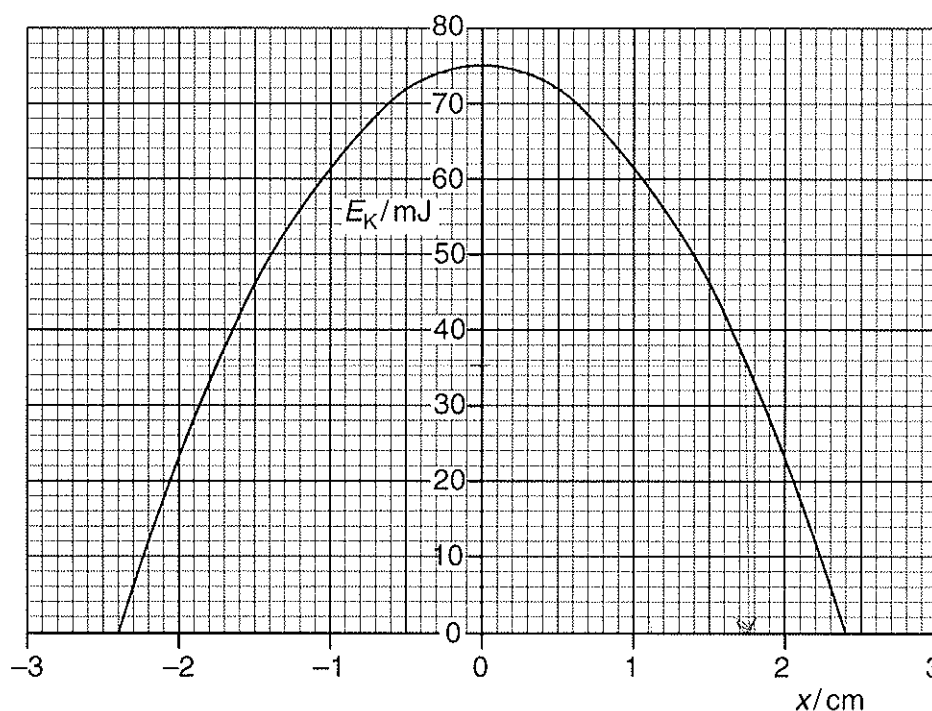

Fig. 3.2

(a)   Use data from Fig. 3.2 to calculate the frequency of oscillation of the trolley.

frequency = ... Hz [4]

(b) The trolley loses energy so that its maximum kinetic energy is reduced **by** 40 mJ.

Use Fig. 3.2, without any further calculation, to determine the amplitude of the oscillations.
Show your construction on Fig. 3.2.

amplitude = ... cm [2]

[Turn over

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