1 A girl falls vertically onto a trampoline, as shown in Fig. 1.1
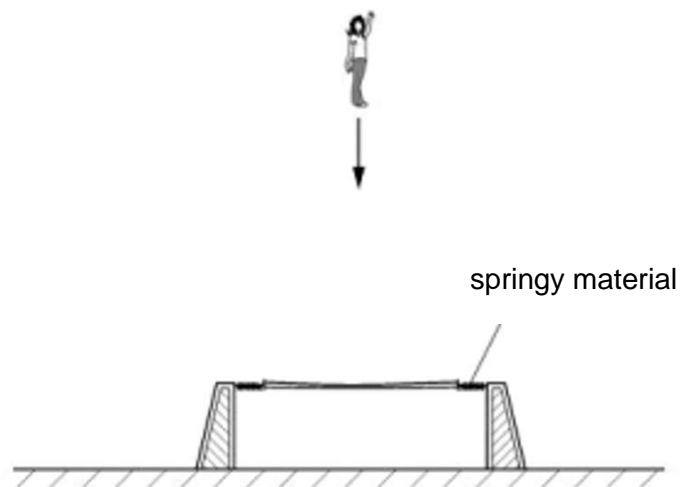

springy material

Fig. 1.1

The trampoline consists of a central section supported by springy material. At time $t = 0$, the girl starts to fall. The girl hits the trampoline and rebounds vertically. The variation with time t of velocity v of the girl is illustrated in Fig. 1.2.
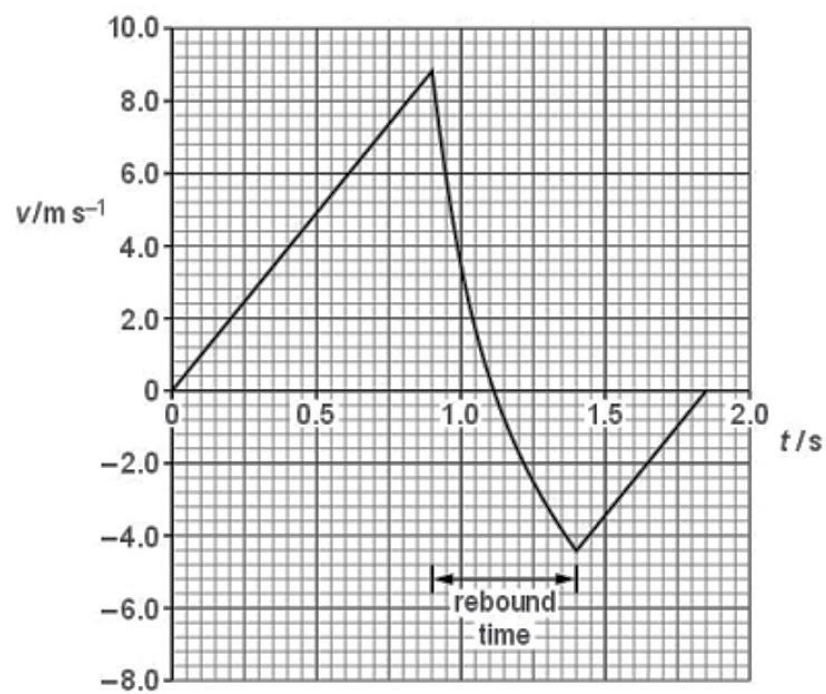

Fig. 1.2

(a) For the motion of the girl, calculate

(i) the distance fallen between time $t = 0$ and when she hits the trampoline,

distance = …………...……... m [1]

(ii) the average acceleration during the rebound.

acceleration = …………………... m s^{-2} [2]

(b) **(i)** Explain, without calculation, how Fig. 1.2 shows that the acceleration of the girl before and after the rebound is the same.

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(ii) Use Fig. 1.2 to compare, without calculation, the potential energy of the girl at $t = 0$ and $t = 1.85$ s. Explain your answer.

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[Total: 6]