Answer on Question #60130-Physics-Mechanics-Relativity

A ball dropped from a certain height, falls in the influence of uniform gravity, strikes the ground and repeatedly rebounds elastically. During a time interval $t = 8s$ from it was dropped, it covers a distance $s = 20m$. How many collisions n during this time did the ball made with the ground? Acceleration of free fall is $g = 10\frac{m}{s^2}$

Solution

$$n\ collisions \rightarrow 2n\ times\ a\ ball\ covers\ a\ distance\ h.$$

$$h = \frac{s}{2n}.$$

$$\tau = \frac{t}{2n}$$

$$h = \frac{gt^2}{2} \rightarrow \frac{s}{2n} = \frac{g}{2}\left(\frac{t}{2n}\right)^2$$

$$n = \frac{gt^2}{4s} = \frac{10 \cdot 8^2}{4 \cdot 20} = 8.$$

Answer: 8.

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