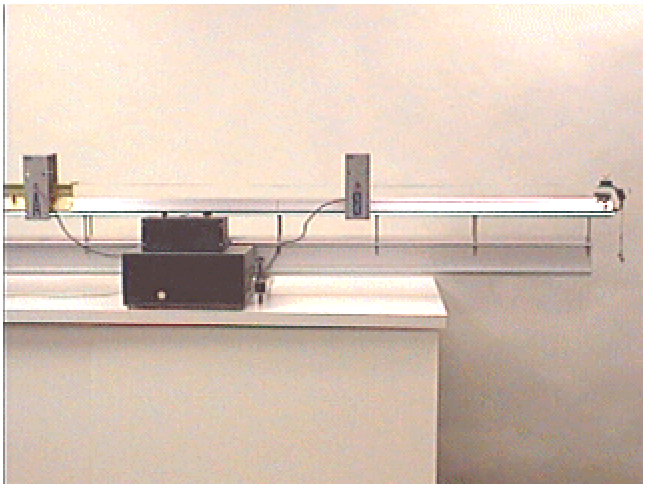
Answer #135

Part 1:

The answer is (c): 2.00 seconds, as can be seen by clicking your mouse on the photograph below (well, almost).



The equation to determine how far an accelerated body moves as a function of time is:

$$x = (1/2)a\ t^2.$$

where a is the acceleration.

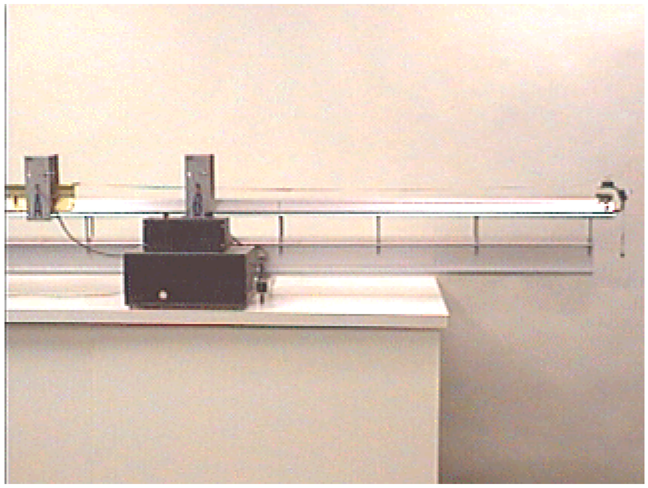
The time for the accelerating body *M* to move the distance *D* between the two photocell gates due to the gravitational force on *m* is given by:

$$t = \text{sqrt}\ [2DM / mg] = t_0,$$

where g is the acceleration of gravity. Substituting 2*M* for *M* and 2*m* for *m* yields approximately $t = t_0$ or 2.00 seconds, reasonably close to the value obtained in the video.

Part 2:

The answer is (d): 2.00 seconds, as can be seen by clicking your mouse on the photograph below.



The equation to determine how far an accelerated body moves as a function of time is:

$$x = (1/2)a\,t^2.$$

where a is the acceleration.

The time for the accelerating body *M* to move the distance *D* between the two photocell gates due to the gravitational force on *m* is given by:

$$t = \mathrm{sqrt}\,[2\,DM / mg] = t_0,$$

where g is the acceleration of gravity. Substituting *D*/2 for *D* and 2*M* for *M*, the factors of two cancel each other, yielding $t = t_0$ or approximately 2.00 seconds, reasonably close to the value obtained in the video.

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For questions and comments regarding the *Question of the Week* contact
Dr. Richard E. Berg by e-mail or using phone number or regular mail address
given on the Lecture-Demonstration Home Page.