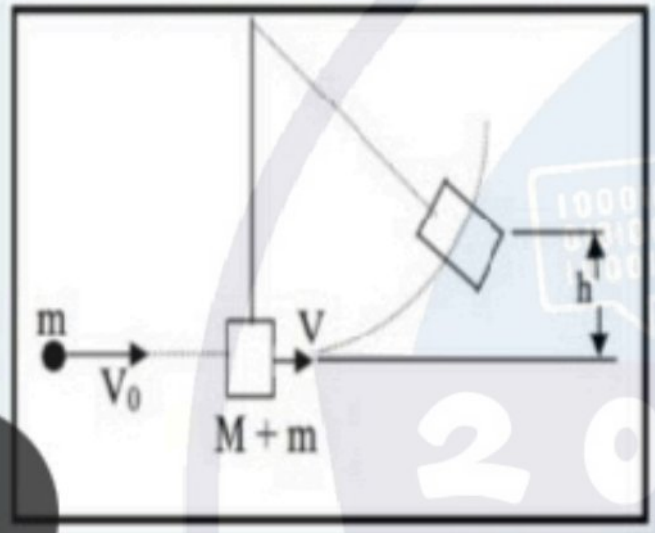
Time left 0:25:09

In the "Ballistic Pendulum" experiment (shown in the figure below), which of the following is the correct relation between the initial speed (v_0) of the ball and the maximum height (h) of the pendulum after collision:



- $h = \frac{(mv_0)^2}{(m+M)^2}$
- $h = \frac{(mv_0)^2}{2g(m+M)^2}$
- $h = \frac{(v_0)^2}{2g(m+M)^2}$
- $h = \frac{2g(mv_0)^2}{(m+M)^2}$
- $h = \frac{(2gmv_0)^2}{(m+M)^2}$

[1] $V_0 m = (m+M)V$

$$V = \frac{V_0 m}{m+M} \quad --(1)$$

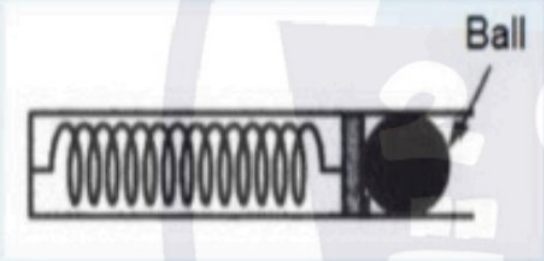
$$\frac{1}{2}(m+M)V^2 = gh(m+M)$$

$$V^2 = 2gh$$

$$\left(\frac{m v_0}{m+M}\right)^2 = 2gh$$

$$h = \frac{(m v_0)^2}{(m+V)^2 2g}$$

A spring of a spring gun, having constant k = 625 N/m, is compressed horizontally a distance x = 0.05 m from its relaxed state. A ball of mass m = 0.02 kg is put in the barrel. Once the gun is fired (i.e. the spring returns to its relaxed state), the speed (in m/s) with which the ball will leave the barrel is:



- [x] a. 19.8
- [ ] b. 2.87
- [ ] c. 4.35
- [ ] d. 22.14
- [ ] e. 8.84

Clear my choice

$$\frac{1}{2}mv^2 = \frac{1}{2}kx^2$$

$$v = \sqrt{\frac{kx^2}{m}}$$

$$v = \sqrt{\frac{625 * (0.05)^2}{0.02}}$$

$$\left[v = 8.84 \text{ m/s}^2 \right]$$