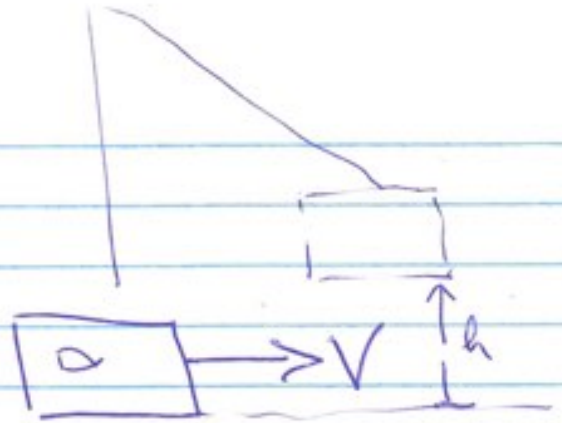


Ballistic Pendulum

$$m = 0.01 \text{ kg}$$

$$M = 5.00 \text{ kg}$$



Block + bullet has velocity V immediately after the collision, but still at lowest point.

$$mv = (M+m)V \quad (1)$$

After collision, mechanical energy is conserved.

$$\therefore \frac{1}{2} (M+m) V^2 = (M+m) g h$$

$$\therefore V^2 = 2 g h$$

$$= 2 \times \left(9.8 \frac{\text{m}}{\text{s}^2} \right) (0.1 \text{ m})$$

$$= 1.96 \frac{\text{m}^2}{\text{s}^2}$$

$$\therefore V = 1.40 \frac{\text{m}}{\text{s}}$$

$$\therefore v = \frac{(M+m)}{m} V = \frac{5.01 \text{ kg}}{0.01 \text{ kg}} \times 1.40 \frac{\text{m}}{\text{s}} = 701 \frac{\text{m}}{\text{s}}$$