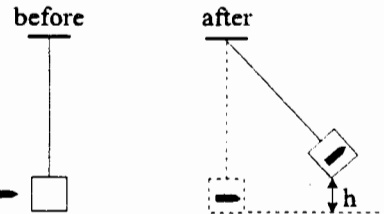


EXAM 3

Name: _____ Student ID #: _____

TA (circle one): Ali Ben Brigham Dan Elspeth Eric Geoff

A 3.25 gram bullet traveling at v_{01} m/s, strikes a 0.850 kg wooden block in a ballistic pendulum situation (see drawing). The block with the embedded bullet rises a vertical distance $h = 15.5$ cm.



A. [12 pts.] What is the speed V of the block with the embedded bullet just after impact?

$$E_0 = E$$

$$E_0 = \frac{1}{2} (m_{BUL} + m_{BL}) V^2 = (m_{BUL} + m_{BL}) g h$$

$$V = \sqrt{2gh} = \sqrt{(2)(9.8 \text{ m/s}^2)(.155 \text{ m})}$$

$V = 1.74 \text{ m/s}$

B. [12 pts.] What is the speed v_{01} of the bullet just before hitting the wooden block?

$$P_{TOT}(B \& B) = P_{TOT}(A \& P)$$

$$m_{BUL} v_{01} = (m_{BUL} + m_{BL}) V$$

$$v_{01} = \frac{m_{BUL} + m_{BL}}{m_{BUL}} V = \frac{0.85325 \text{ kg}}{.00325 \text{ kg}} \times 1.74 \text{ m/s}$$

$v_{01} = 457 \text{ m/s}$

C. [1 pts.] If the bullet passed all the way through the block and kept going but at a reduced speed, would the block rise *not* as high, higher, or the same 15.5 cm?

THE BLOCK WOULD NOT RISE AS HIGH.