24. (a) To relate the sliding distance to the speed V of the bullet-plus-block at the instant it has finished embedding itself in the block, we can either use Eq. 2-16 and $\vec{F}_{\text{net}} = m\vec{a}$, or energy conservation as expressed by Eq. 8-31 (with $W = 0$ and $f_k = \mu_k(m + M)g$ using Eq. 6-2). We choose the latter approach:

$$\begin{aligned} K_{\text{bullet plus block}} &= \Delta E_{\text{th}} \\ \frac{1}{2}(m + M)V^2 &= \mu_k(m + M)gd \end{aligned}$$

which yields $V = \sqrt{2\mu_k\, gd} = 2.7$ m/s.

(b) For the collision itself, we use momentum conservation (with the direction of motion being positive).

$$\begin{aligned} m_{\text{bullet}} v_i &= (m + M)V \\ (0.0045\,\text{kg})v_i &= (2.4045\,\text{kg})(2.7\text{m/s}) \end{aligned}$$

which gives the result $v_i = 1.4 \times 10^3$ m/s.