50. The axis of rotation is in the middle of the rod, $r = 0.25$ m from either end. By Eq. 12-19, the initial angular momentum of the system (which is just that of the bullet, before impact) is $rmv \sin\phi$ where $m = 0.003$ kg and $\phi = 60°$. Relative to the axis, this is counterclockwise and thus (by the common convention) positive. After the collision, the moment of inertia of the system is $I = I_{\text{rod}} + mr^2$ where $I_{\text{rod}} = ML^2/12$ by Table 11-2(e), with $M = 4.0$ kg and $L = 0.5$ m. Angular momentum conservation leads to

$$rmv \sin\phi = \left(\frac{1}{12}ML^2 + mr^2\right)\omega \ .$$

Thus, with $\omega = 10$ rad/s, we obtain

$$v = \frac{\left(\frac{1}{12}(4.0)(0.5)^2 + (0.003)(0.25)^2\right)(10)}{(0.25)(0.003)\sin 60°} = 1.3 \times 10^3 \text{ m/s} \ .$$