100. (a) We apply Newton's second law to the rod

$$m\frac{dv}{dt} = iBL \ ,$$

and integrate to obtain

$$v = \frac{iBLt}{m} \ .$$

The velocity $\vec{v}$ points away from the generator G.

(b) When the current i in the rod becomes zero, the rod will no longer be accelerated by a force $F = iBL$ and will therefore reach a constant terminal velocity. This occurs when $|\mathcal{E}_{\text{induced}}| = \mathcal{E}$. Specifically,

$$|\mathcal{E}_{\text{induced}}| = \left|\frac{d\Phi_B}{dt}\right| = \left|\frac{d(BA)}{dt}\right| = B\left|\frac{dA}{dt}\right| = BvL = \mathcal{E} \ .$$

Thus, $\vec{v} = \mathcal{E}/BL$, leftward.

(c) In case (a) electric energy is supplied by the generator and is transferred into the kinetic energy of the rod. In the case considered now the battery initially supplies electric energy to the rod, causing its kinetic energy to increase to a maximum value of $\frac{1}{2}mv^2 = \frac{1}{2}(\mathcal{E}/BL)^2$. Afterwards, there is no further energy transfer from the battery to the rod, and the kinetic energy of the rod remains constant.