a) The force on the positron is
\[ \vec{F} = q\vec{E} = e\vec{E}. \]
Because the positron charge is positive, the force on it is parallel to the field. Therefore, release the positron near plate B so the force will accelerate it to plate A.

b) Apply Newton's second law to the positron, using vector magnitudes,
\[ F_{\text{total}} = ma \implies a = \frac{F_{\text{total}}}{m} = \frac{eE}{m}. \]
Choose \( \hat{i} \) in the direction of motion of the positron, and choose the origin at the point of its release. Apply the kinematic equation for motion with a constant acceleration,
\[ x(t) = x_0 + v_{x0}t + \frac{a_x t^2}{2} = 0 \text{ m} + (0 \text{ m/s})t + \frac{a_x t^2}{2} \]
\[ \implies t = \frac{2v}{a_x}. \]

Now apply the other kinematic equation in the direction of motion,
\[ v_x(t) = v_{x0} + a_x t = 0 \text{ m/s} + a_x t \]
\[ \implies v_x = a_x \sqrt{\frac{2x}{a_x}} = \sqrt{2a_x x} \]
\[ \implies v_x = \sqrt{\frac{2eEx}{m}} = \sqrt{\frac{2(1.602 \times 10^{-19} \text{ C})(250 \text{ N/C})(3.00 \times 10^{-2} \text{ m})}{9.11 \times 10^{-31} \text{ kg}}} \]
\[ \implies v_x = 1.62 \times 10^6 \text{ m/s}. \]

c) The kinetic energy is
\[ KE = \frac{1}{2}mv^2 \]
\[ \implies KE = \frac{(9.11 \times 10^{-31} \text{ kg})(1.62 \times 10^6 \text{ m/s})^2}{2} = 1.20 \times 10^{-18} \text{ J}, \]
which, when expressed in units of electron volts, is
\[ KE = \frac{1.20 \times 10^{-18} \text{ J}}{1.602 \times 10^{-19} \text{ J/eV}} = 7.49 \text{ eV}. \]

16.65 Choose a coordinate system with \( \hat{i} \) pointing in the direction of travel of the electron, and with origin at the point where the electron enters the field. Then, in this coordinate system, the electric force on the electron is
\[ \vec{F} = q\vec{E} = qE\hat{i} = -eE\hat{i}, \]