8. (a) Letting $\vec{F} = q(\vec{E} + \vec{v} \times \vec{B}) = 0$, we get $vB \sin\phi = E$. We note that (for given values of the fields) this gives a minimum value for speed whenever the $\sin\phi$ factor is at its maximum value (which is 1, corresponding to $\phi = 90°$). So $v_{\min} = E/B = (1.50 \times 10^3\,\text{V/m})/(0.400\,\text{T}) = 3.75 \times 10^3\,\text{m/s}$.

(b) Having noted already that $\vec{v} \perp \vec{B}$, we now point out that $\vec{v} \times \vec{B}$ (which direction is given by the right-hand rule) must be in the direction opposite to $\vec{E}$. Thus, we can use the *left* hand to indicate the arrangement of vectors: if one points the thumb, index finger, and middle finger on the left hand so that all three are mutually perpendicular, then the thumb represents $\vec{v}$, the index finger indicates $\vec{B}$, and the middle finger represents $\vec{E}$.