75. We take the current ($i = 50$ A) to flow in the $+x$ direction, and the electron to be at a point P which is $r = 0.050$ m above the wire (where "up" is the $+y$ direction). Thus, the field produced by the current points in the $+z$ direction at P. Then, combining Eq. 30-6 with Eq. 29-2, we obtain $\vec{F}_e = (-e\mu_0 i/2\pi r)(\vec{v} \times \hat{\mathrm{k}})$.

(a) The electron is moving down: $\vec{v} = -v\,\hat{\mathrm{j}}$ (where $v = 1.0 \times 10^7$ m/s is the speed) so

$$\vec{F}_e = \frac{-e\mu_0 iv}{2\pi r}\left(-\hat{\mathrm{i}}\right) = 3.2 \times 10^{-16}\ \mathrm{N}\ \hat{\mathrm{i}}\ .$$

(b) In this case, the electron in the same direction as the current: $\vec{v} = v\,\hat{\mathrm{i}}$ so

$$\vec{F}_e = \frac{-e\mu_0 iv}{2\pi r}\left(-\hat{\mathrm{j}}\right) = 3.2 \times 10^{-16}\ \mathrm{N}\ \hat{\mathrm{j}}\ .$$

(c) Now, $\vec{v} = \pm v\hat{\mathrm{k}}$ so $\vec{F}_e \propto \hat{\mathrm{k}} \times \hat{\mathrm{k}} = 0$.