73. (a) The field in this region is entirely due to the long wire (with, presumably, negligible thickness). Using Eq. 30-19,

$$|\vec{B}| = \frac{\mu_0\, i_w}{2\pi r} = 4.8 \times 10^{-3}\ \mathrm{T}$$

where $i_w = 24$ A and $r = 0.0010$ m.

(b) Now the field consists of two contributions (which are antiparallel) – from the wire (Eq. 30-19) and from a portion of the conductor (Eq. 30-22 modified for annular area):

$$\begin{aligned} |\vec{B}| &= \frac{\mu_0\, i_w}{2\pi r} - \frac{\mu_0\, i_{\text{enc}}}{2\pi r} \\ &= \frac{\mu_0\, i_w}{2\pi r} - \frac{\mu_0\, i_c}{2\pi r}\left(\frac{\pi r^2 - \pi R_i^2}{\pi R_o^2 - \pi R_i^2}\right) \end{aligned}$$

where $r = 0.0030$ m, $R_i = 0.0020$ m, $R_o = 0.0040$ m and $i_c = 24$ A. Thus, we find $|\vec{B}| = 9.3\times10^{-4}$ T.

(c) Now, in the external region, the individual fields from the two conductors cancel completely (since $i_c = i_w$): $\vec{B} = 0$.