Chapter 9, Solution 84.

Let $\quad \mathbf{Z}_1 = R_1 \,||\, \dfrac{1}{j\omega C_s}, \qquad \mathbf{Z}_2 = R_2, \qquad \mathbf{Z}_3 = R_3$, and $\mathbf{Z}_x = R_x + j\omega L_x$.

$$\mathbf{Z}_1 = \frac{\dfrac{R_1}{j\omega C_s}}{R_1 + \dfrac{1}{j\omega C_s}} = \frac{R_1}{j\omega R_1 C_s + 1}$$

Since $\mathbf{Z}_x = \dfrac{\mathbf{Z}_3}{\mathbf{Z}_1}\mathbf{Z}_2$,

$$R_x + j\omega L_x = R_2 R_3 \frac{j\omega R_1 C_s + 1}{R_1} = \frac{R_2 R_3}{R_1}(1 + j\omega R_1 C_s)$$

Equating the real and imaginary components,

$$\mathbf{R_x = \frac{R_2 R_3}{R_1}}$$

$\omega L_x = \dfrac{R_2 R_3}{R_1}(\omega R_1 C_s)$ implies that

$$\mathbf{L_x = R_2 R_3 C_s}$$

Given that $R_1 = 40\ k\Omega$, $R_2 = 1.6\ k\Omega$, $R_3 = 4\ k\Omega$, and $C_s = 0.45\ \mu F$

$$R_x = \frac{R_2 R_3}{R_1} = \frac{(1.6)(4)}{40}\ k\Omega = 0.16\ k\Omega = \mathbf{160\ \Omega}$$

$$L_x = R_2 R_3 C_s = (1.6)(4)(0.45) = \mathbf{2.88\ H}$$