Chapter 11, Solution 18.

Find the value of $\mathbf{Z}_L$ in the circuit of Fig. 11.49 for maximum power transfer.
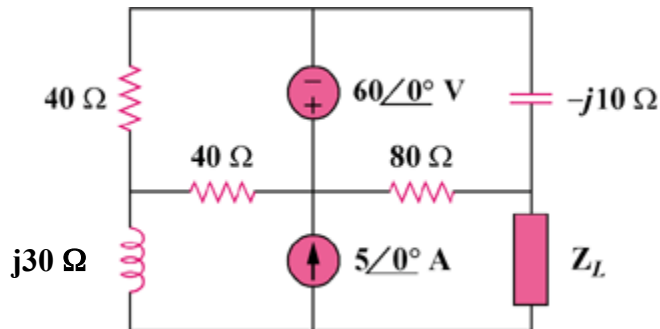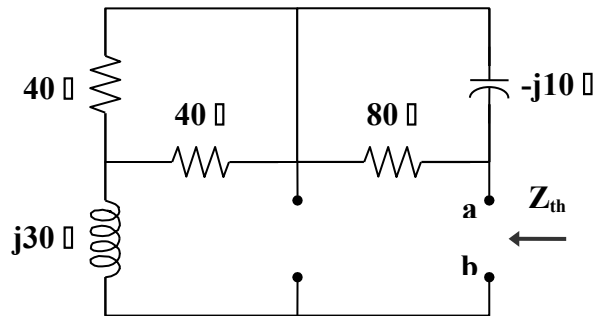

Figure 11.49
For Prob. 11.18.

Solution

We find $\mathbf{Z}_{Th}$ at terminals a-b as shown in the figure below.

$$\mathbf{Z}_{Th} = j30 + 40 \| 40 + 80 \| (\text{-}j10) = j30 + 20 + \frac{(80)(\text{-}j10)}{80 - j10}$$

$$\mathbf{Z}_{Th} = 21.23 + j20.154$$

$$\mathbf{Z}_L = \mathbf{Z}_{Th}^* = [21.23 \text{-} j20.15] \ \Omega$$