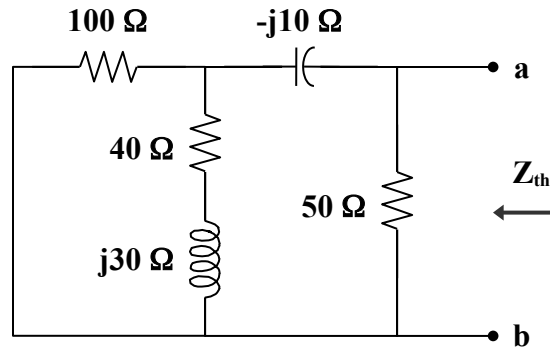


### Chapter 11, Solution 21.

We find  $Z_{Th}$  at terminals a-b, as shown in the figure below.



$$Z_{Th} = 50 \parallel [-j10 + 100 \parallel (40 + j30)]$$

$$\text{where } 100 \parallel (40 + j30) = \frac{(100)(40 + j30)}{140 + j30} = 31.707 + j14.634$$

$$Z_{Th} = 50 \parallel (31.707 + j14.634) = \frac{(50)(31.707 + j14.634)}{81.707 + j14.634}$$

$$Z_{Th} = 19.5 + j1.73$$

$$R_L = |Z_{Th}| = \mathbf{19.58\ \Omega}$$