

### Chapter 9, Solution 45.

Find current  $\mathbf{I}_o$  in the network of Fig. 9.52.

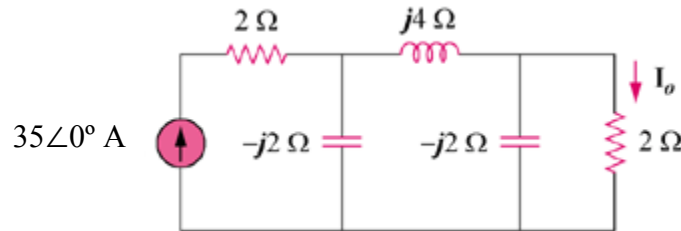
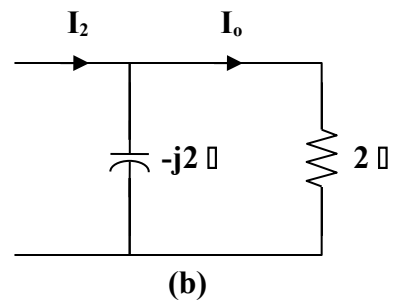
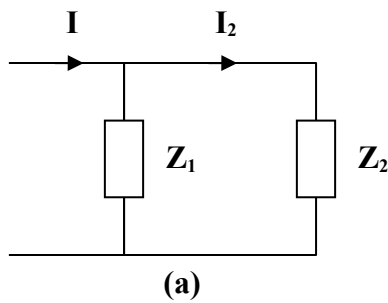


Figure 9.52  
For Prob. 9.45.

### Solution

We obtain  $\mathbf{I}_o$  by applying the principle of current division twice.



$$\begin{aligned}
 \mathbf{Z}_1 &= -j2, & \mathbf{Z}_2 &= j4 + (-j2) \parallel 2 = j4 + \frac{-j4}{2 - j2} = 1 + j3 \\
 \mathbf{I}_2 &= \frac{\mathbf{Z}_1}{\mathbf{Z}_1 + \mathbf{Z}_2} \mathbf{I} = \frac{-j2}{-j2 + 1 + j3} (5\angle 0^\circ) = \frac{-j10}{1 + j} \\
 \mathbf{I}_o &= \frac{-j2}{2 - j2} \mathbf{I}_2 = \left( \frac{-j}{1 - j} \right) \left( \frac{-j10}{1 + j} \right) = \frac{-10}{1 + 1} = -5 \text{ A}
 \end{aligned}$$