ECE 336, spring 2024, Homework #5, **Due: 1:00 PM, March 4, 2024**

**1.)** The source of Figure 1 delivers an apparent power of 100 VA with a power factor of 0.8 leading. Find the unknown impedance **Z**.

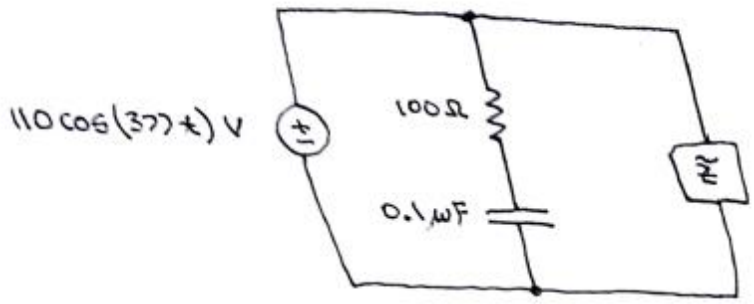


**Figure 1**

**2.)** Determine values of *R* and *L* for the circuit shown in Figure 2 that causes maximum power transfer to the load.

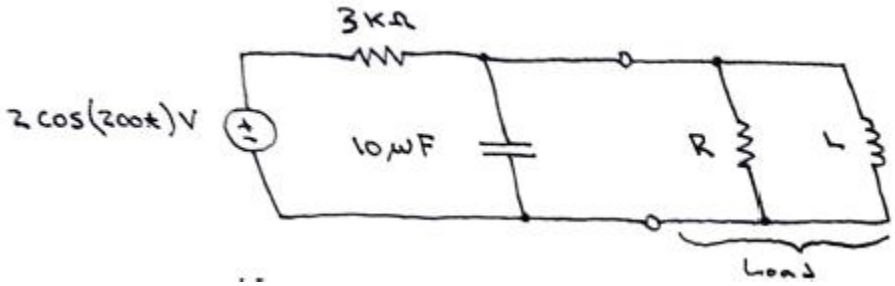


**Figure 2**

**3.)** The source voltage of the circuit shown in Figure 3 is $v_s = 20\cos(20t)$ V. Determine the average power absorbed by resistors and the complex power supplied by the source voltage.

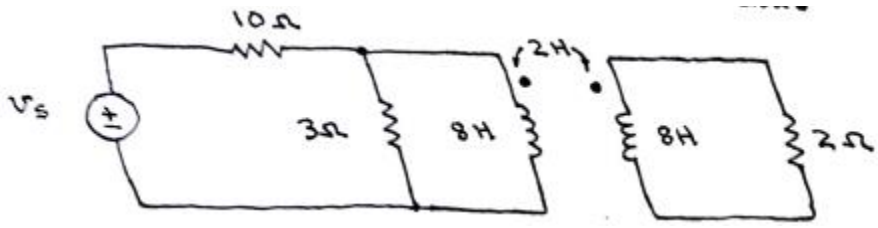


**Figure 3**

**4.)** Determine the mesh currents for the circuit shown in Figure 4.

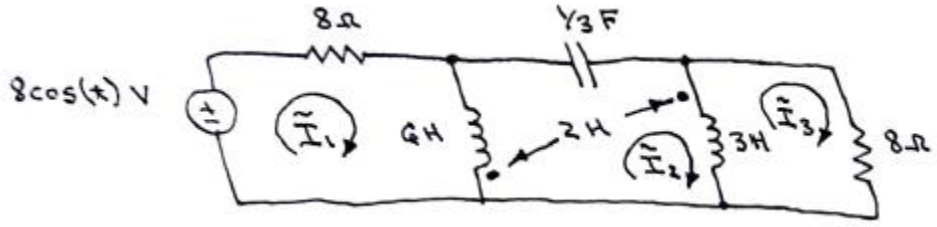


**Figure 4**

**5.)** Determine the mesh currents and the complex power absorbed by each element in the circuit shown in Figure 5. Verify conservation of complex power.

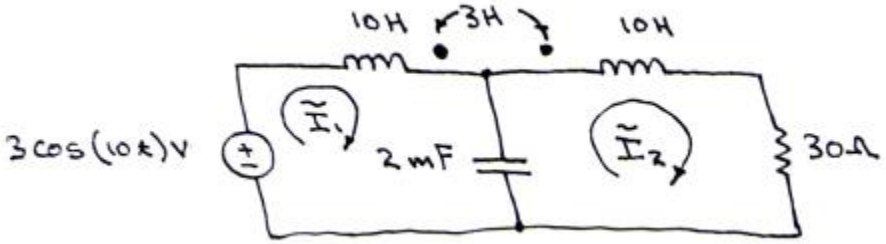


**Figure 5**

**6.)** The source voltage of the circuit shown in Figure 6 is $v_s = 20\cos(20t)$ V. Determine $i_1(t)$ and $i_2(t)$.

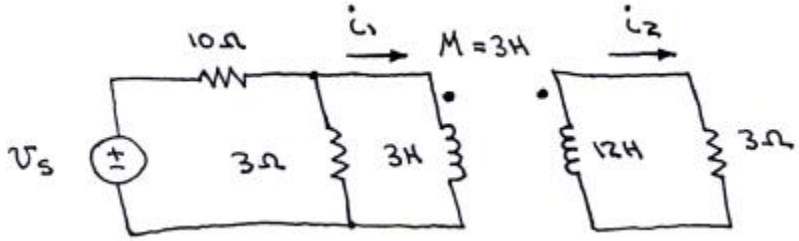


**Figure 6**

**7.)** Find $\mathbf{V}_1$, $\mathbf{V}_2$, $\mathbf{I}_1$, and $\mathbf{I}_2$ for the circuit of Figure 7, when $n = 20$.

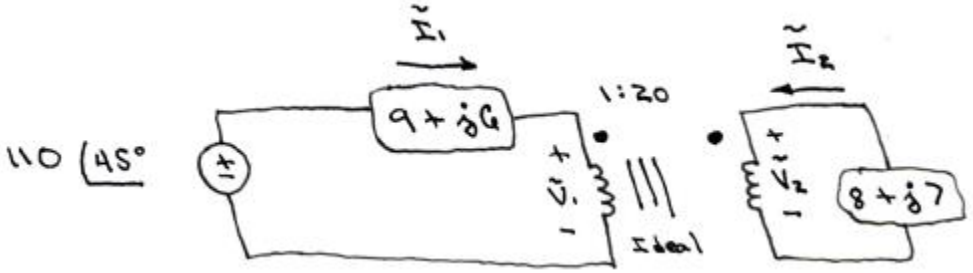


**Figure 7**

**8.)** Find the Thévenin equivalent at terminals a–b for the circuit of Figure 3 when

$v = 16\cos(9t)$ V.

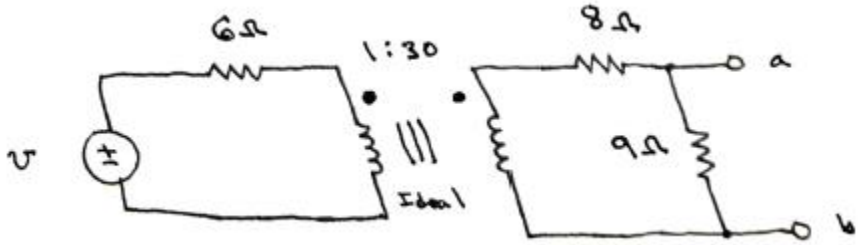


**Figure 8**

**9.)** Determine $v_2$ and $i_2$ for the circuit shown in Figure 4 when $n = 10$. Note that $i_2$ does not enter the dotted terminal.

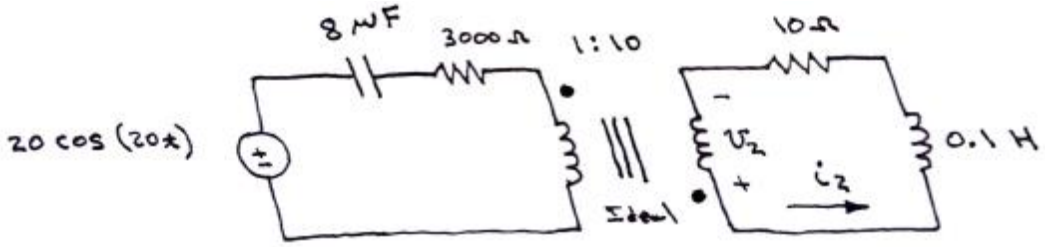


**Figure 9**