ECE 336, spring 2024, Homework #7, **Due: April 1, 2024, 1:00 PM**

1.) Determine the network function, $\mathbf{H}(\omega) = \frac{V_o(\omega)}{V_i(\omega)}$, of the circuit shown in Figure 1.

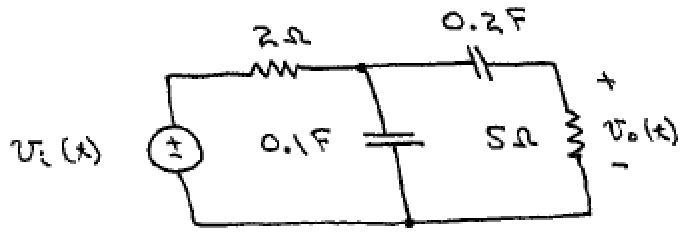

Figure 1

2.) The input to the circuit shown in Figure 2 is the voltage of the voltage source, $v_i(t)$. The output is the voltage, $v_o(t)$. The network function that represents this circuit is:

$$\mathbf{H}(\omega) \equiv \frac{V_o(\omega)}{V_i(\omega)} = \frac{2}{(j\omega)^2 + 3j\omega + 2}$$

Let R = 100 Ω, determine the required values of the inductance, L, and the capacitor, C.

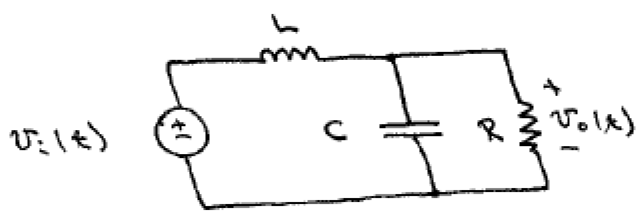

Figure 2

3.) Determine the network function, $\mathbf{H}(\omega) = \mathbf{V}_o(\omega)/\mathbf{V}_i(\omega)$, of the circuit shown in Figure 3.

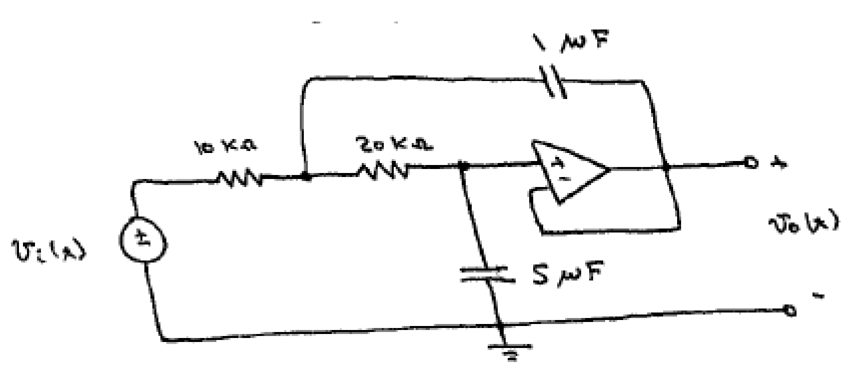

Figure 3

4.) Determine the network function, $\mathbf{H}(\omega) = \mathbf{I}_o(\omega)/\mathbf{V}_i(\omega)$, of the circuit shown in Figure 4.

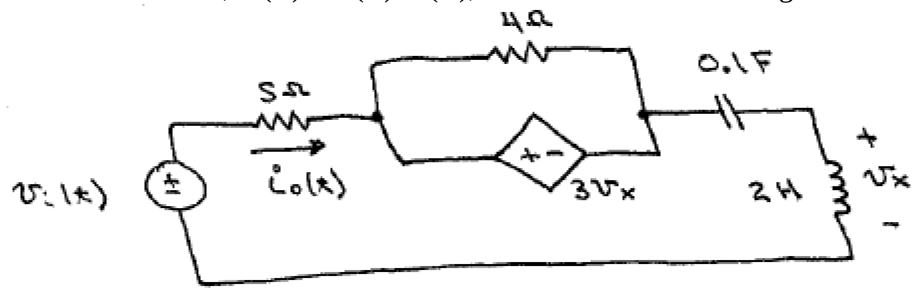

Figure 4

5.) Determine the network function, $\mathbf{H}(\omega) = \mathbf{V}_o(\omega)/\mathbf{I}_{in}(\omega)$, of the circuit shown in Figure 5.

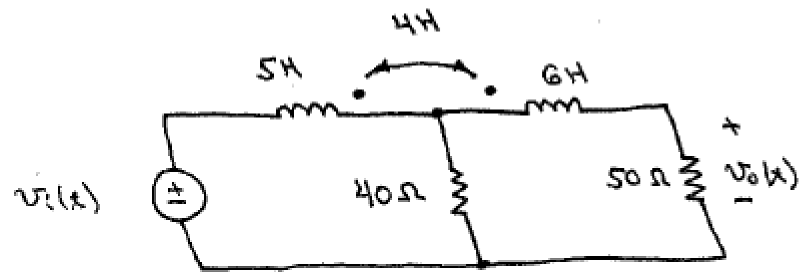

Figure 5

6.) The input to the circuit shown in Figure 6 is the voltage of the voltage source, $v_i(t)$. The output is the voltage, $v_o(t)$. The network function that represents this circuit is

$$\mathbf{H}(\omega) = \frac{\mathbf{V}_o(\omega)}{\mathbf{V}_i(\omega)} = \frac{8}{20 + 100j\omega}$$

Determine the required values of the resistor, R, and of the capacitor, C.

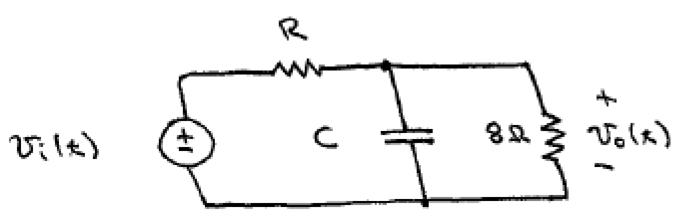

Figure 6