EXERCISE 12.2 For each of the circuits in Figure 12.66, find and sketch the indicated zero-input response corresponding to the indicated initial conditions

a) In Figure 12.66, find v_2, assuming $v_1(0) = 1$ V, $v_2(0) = 0$

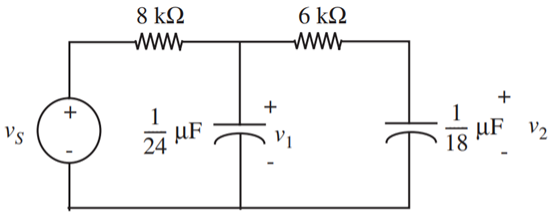
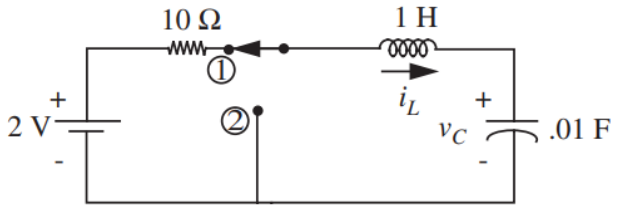


FIGURE 12.66

PROBLEM 12.6 In the circuit in Figure 12.77, the switch has been in position 1 for all $t < 0$. At $t = 0$, the switch is moved to position 2 (and remains there for $t > 0$). Find and sketch $v_C(t)$ and $i_L(t)$ for $t > 0$.



EXERCISE 13.13 In the network shown in Figure 13.72,

$R = 1\ \text{k}\Omega \quad C_1 = 20\ \mu\text{F} \quad C_2 = 20\ \mu\text{F}.$

a) Determine the magnitude and phase of $H(j\omega)$, the transfer function relating V_0/V_i.

b) Given $v_i(t) = \cos(100t) + \cos(10000t)$, determine the sinusoidal steady state output voltage, $v_o(t)$.

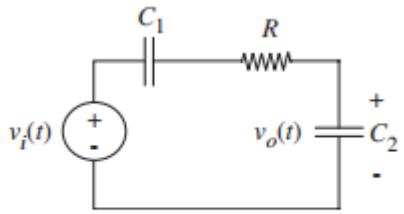


FIGURE 13.72

PROBLEM 13.4 Refer to Figure 13.80 for this problem. Assume $R_1 = 1\ \text{k}\Omega$ and $L_1 = 10$ mH.

a) Find the transfer function $H(j\omega) = V_1/V_o$.

b) Find R so that the DC gain is 1/10.

c) Find a value of L so that the response at high frequencies is equal to response at DC.

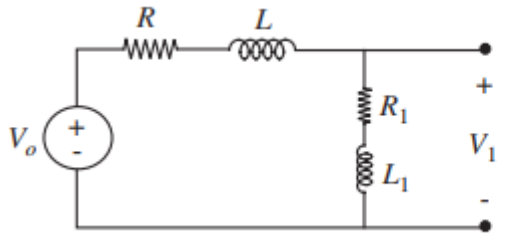


FIGURE 13.80

EXERCISE 15.12 Find and label clearly the Thévenin equivalent for the network in Figure 15.53.

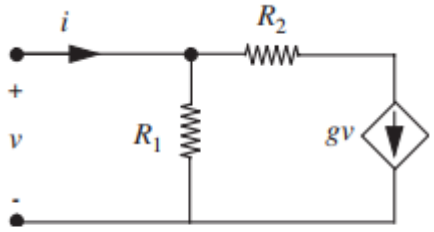


FIGURE 15.53

EXERCISE 15.24 An operational amplifier is connected as shown in Figure 15.65.

a) What is the gain of the amplifier for $\omega = 0$?.

b) Find the expression for $V_o(j\omega)/V_i(j\omega)$.

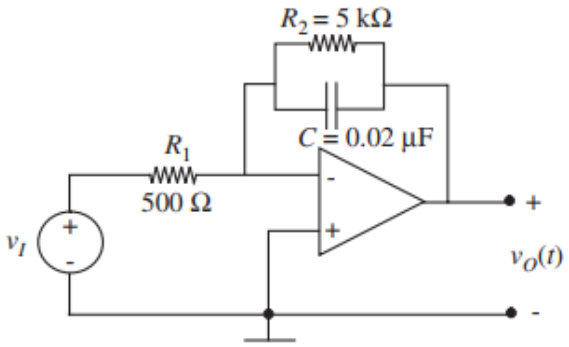


FIGURE 15.65

PROBLEM 15.34 The circuit shown in Figure 15.105 behaves like an RLC circuit.

a) Find the transfer function V_4/V_1. (You may assume that the Op Amp is ideal, that is $V^+ = V^-$ to simplify your calculations.)

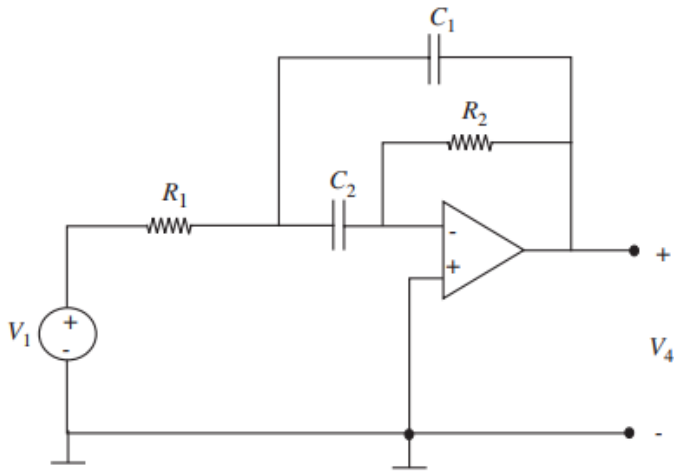
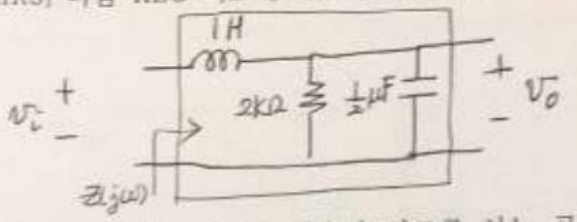


FIGURE 15.105

c) This circuit is known as an RC active filter. Is it a low-pass, high-pass, or band-pass filter? What is the expression for bandwidth in terms at R_1, C_1, etc.? That is, $B = \omega_2 - \omega_1$ where ω_1 and ω_2 are the half power frequencies.

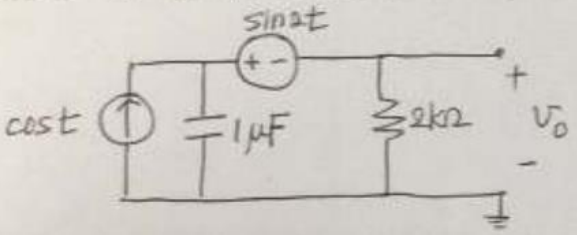
1. [20 points] 다음 RLC 회로에 대한 물음에 답하여라.



(a) [10 points] 등가 임피던스가 실수가 되도록 하는 공진 주파수 ω 를 구하여라. Find the resonance frequency (ω) to make the equivalent impedance be real.

(b) [10 points] 이 회로의 주파수 응답 $H(j\omega)=\frac{V_o(j\omega)}{V_i(j\omega)}$ 을 구하고 크기 $|H(j\omega)|$ 를 근사적으로 도시하여라. Find the frequency response of the circuit. $H(j\omega)=\frac{V_o(j\omega)}{V_i(j\omega)}$ and sketch the magnitude plot $|H(j\omega)|$. Hint: Find the values at ($\omega=0,\infty$, resonance frequency)

2. [10 points] 다음 회로에서 sinusoidal steady state 에서의 출력 전압을 구하여라.



Find the output voltage at the steady state