

※ 考生請注意：本試題可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Given the circuit shown in Figure 1, please find the equation for $i(t)$, $t > 0$. (10%)

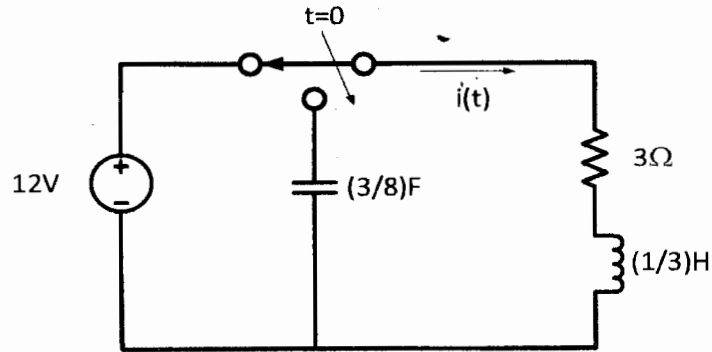


Figure 1

2. Please determine the **parameters R and L** so that the circuit shown in Figure 2 operates as a band-pass filter with an ω_0 of 1000 rad/sec and a bandwidth of 50 rad/sec when we use $C = 1\mu\text{F}$. (20%)

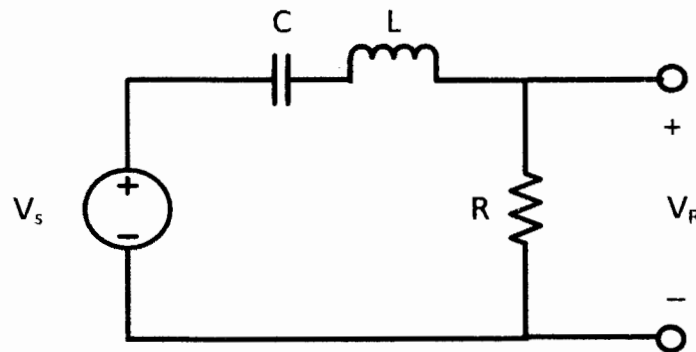


Figure 2

3. Given the figure shown in Figure 3, please answer the following:
- Find the **transfer function** $(V_o(s)/V_s(s))$ of the network.
 - What type of the **filter** is this circuit?
 - Given $R_2 = 10\text{ k}\Omega$, determine **R_1 and C** if the desired cut-off frequency $\omega_c = 10\text{ rad/sec}$ with passband **gain = -20**. (20%)

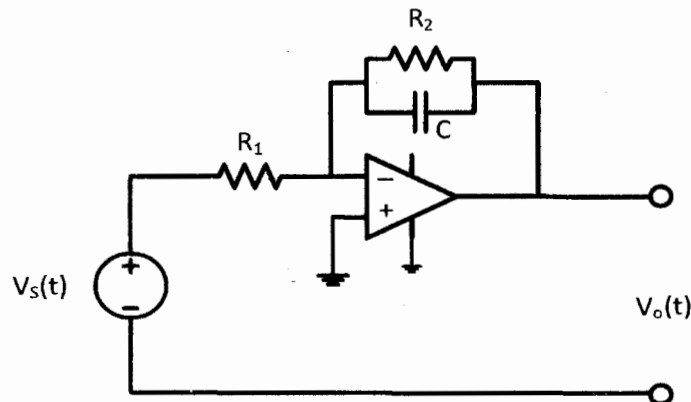


Figure 3

4. For the two circuits shown in Figure 4, obtain the transfer function $V_o(s)/V_i(s)$, the resonant frequency and the bandwidth of each circuit. (30%)

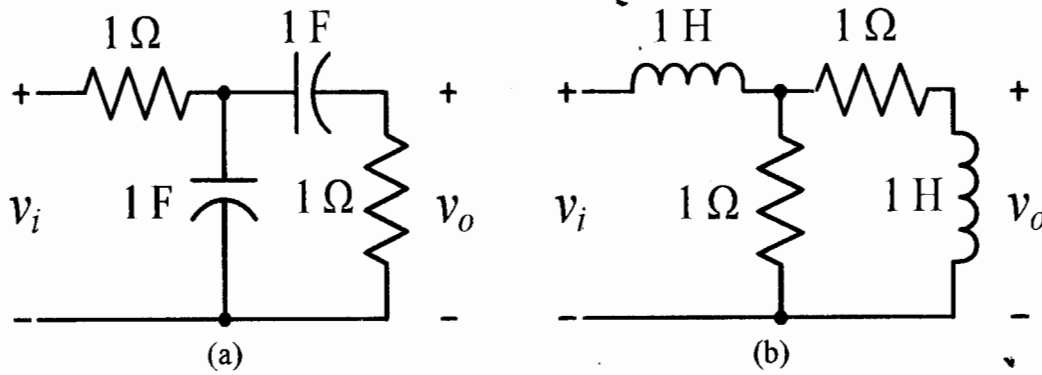


Figure 4

5. Find the z parameters for the circuit shown in Figure 5. (20%)

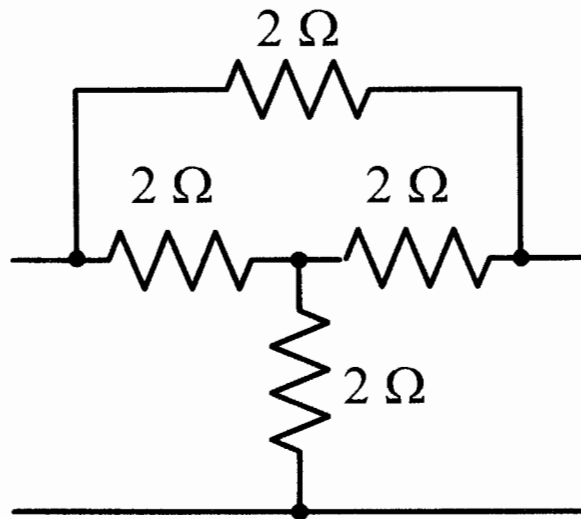


Figure 5