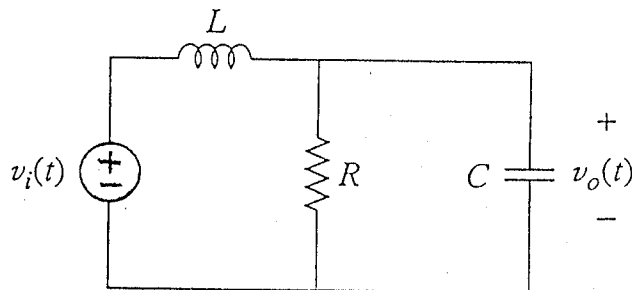


1. The voltage transfer function of a certain circuit is given by

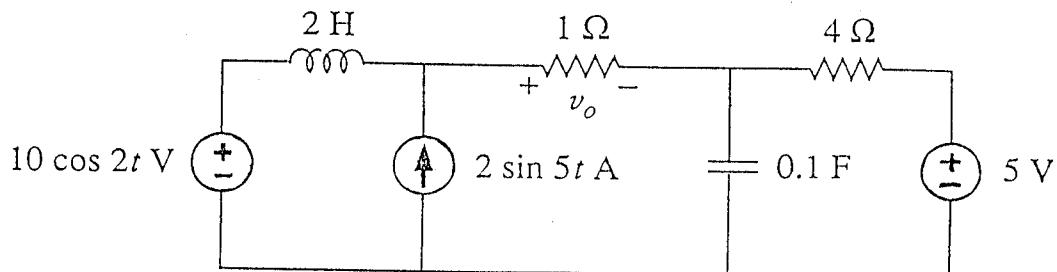
$$H(j\omega) = \frac{3j\omega}{1 - \omega^2 + j\omega}$$

What is the differential equation relating the output voltage  $v_o(t)$  to the input voltage  $v_i(t)$ ? (10%)

2. Determine what type of filter is shown below. Calculate the corner frequency. Take  $R = 2 \text{ k}\Omega$ ,  $L = 2 \text{ H}$ , and  $C = 2 \text{ }\mu\text{F}$ . (20%)



3. Find  $v_o$  in the circuit below. (20%)



(背面仍有題目，請繼續作答)

4. The switch in the circuit of Fig. 1 has been in Position-1 for a long time before moving to Position-2 at  $t = 0$ . Then, the switch is thrown to Position-3 at  $t = 2$  ms. Please find  $V(t)$  for  $t \geq 0$ . (15%)

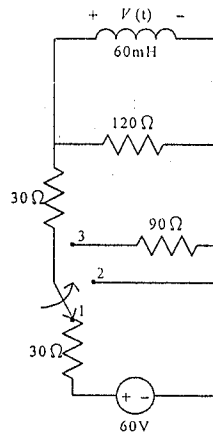


Fig. 1

5. As the circuit depicted in Fig. 2, please calculate the current  $i_1$  flowing through the  $4\Omega$  resistor. (15%)

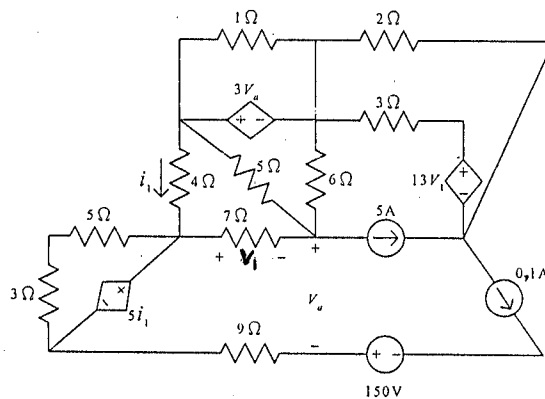


Fig. 2

6. In the circuit of Fig. 3, please compute the average power dissipated at the  $500\Omega$  resistor. (20%)

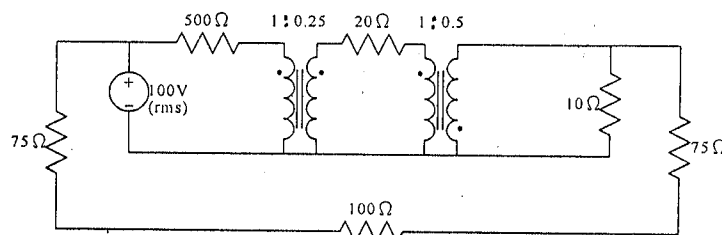


Fig. 3