

※ 考生請注意：本試題  可  不可 使用計算機

1. In Fig. 1, suppose the switch S1 is opened at  $t = 0$ . (a). Please determine  $i(t)$  and  $v(t)$  for  $t > 0$ . (10%) (b). What is the power factor of the voltage source  $v_s(t)$ ? (5%) (c). If the power factor of  $v_s(t)$  would like to be corrected into 0.95, what device and what impedance should be connected in parallel with the load? (5%)

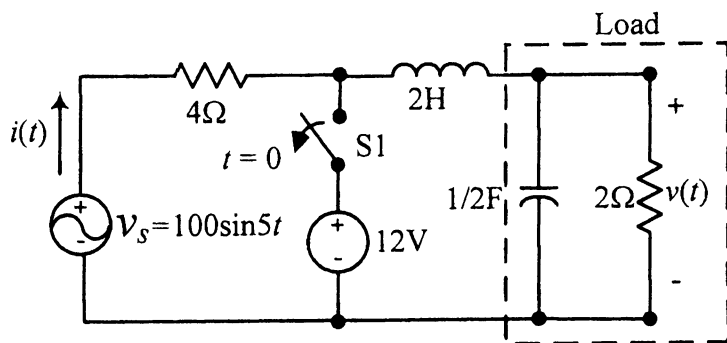


Fig. 1

2. In Fig. 2, let  $I_s = 10\angle 0^\circ A$ . (a). What is the Thevenin equivalent of the circuit in the dashed-line block with terminals A and B. (10%) (b). What are the voltage magnitude and phase of  $V_L$ ? (10%) (c). What is the power consumed at the resistor R? (10%)

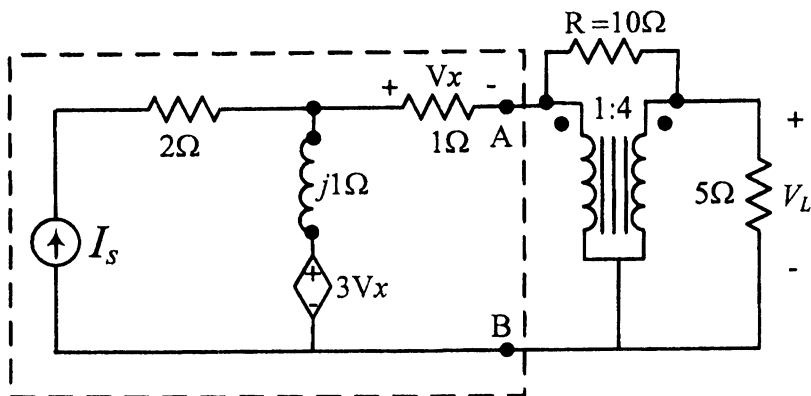


Fig. 2

(背面仍有題目,請繼續作答)

※ 考生請注意：本試題 可 不可 使用計算機

3. In Fig. 3, derive the input impedance  $Z_{in}$  in terms of five impedances  $Z_1$ ,  $Z_2$ ,  $Z_3$ ,  $Z_4$ , and  $Z_5$ . (10%) How to use four  $1-\Omega$  resistors and one  $1-\mu\text{F}$  capacitor for  $Z_1$ ,  $Z_2$ ,  $Z_3$ ,  $Z_4$ , and  $Z_5$  to make the input impedance  $Z_{in}$  as one equivalent inductor? (5%) What is this inductance value of  $Z_{in}$ ? (5%)

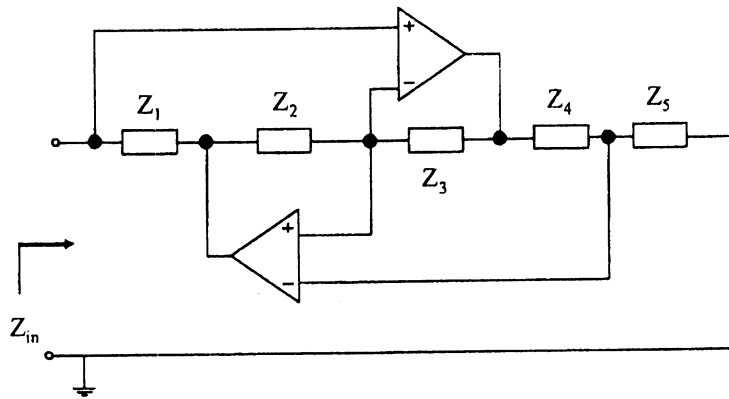


Fig. 3

4. In Fig. 4, calculate the current value of  $I_1$  and the voltage level of  $V_1$ . (20%)

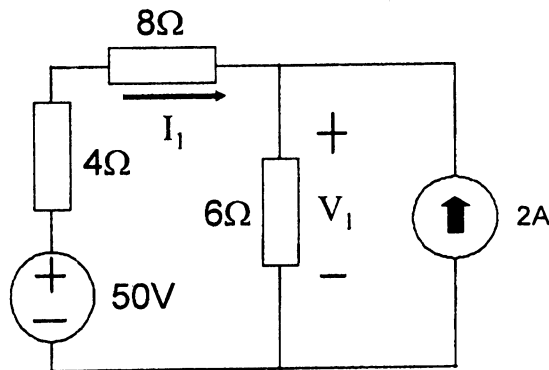


Fig. 4

※ 考生請注意：本試題 可 不可 使用計算機

5. Derive the transfer function of  $\frac{V_o}{V_i}$ . (10%)

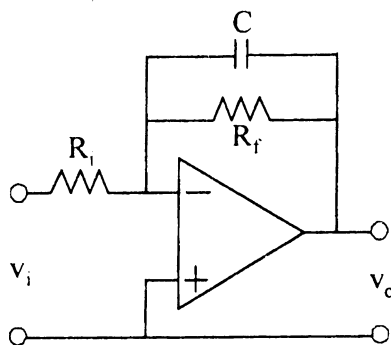


Fig. 5