

國立臺灣科技大學
九十三學年度碩士班考試試題

系所組別：電機工程系甲組
科目：電路學

電路學總分 100 分，共 5 題，每題 20 分。

1. The network in Fig.1 has $i(t) = 10\cos(50000t) \text{ mA}$. Find the steady-state voltages $v(t)$, $v_L(t)$, and $v_C(t)$. (20 points)

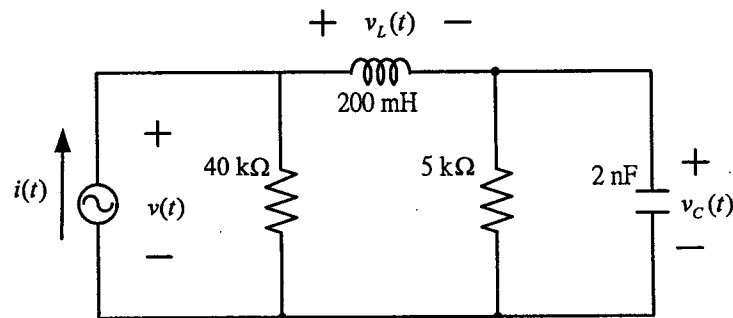


Fig. 1

2. Find the P_1 and P_2 wattmeter readings when the circuit in Fig.2 has the three-phase balanced line-to-line voltage $V_l = 780 \text{ V(rms)}$ and the three-phase balanced load $\hat{Z}_1 = 36 + j27 \Omega$. (20 points)

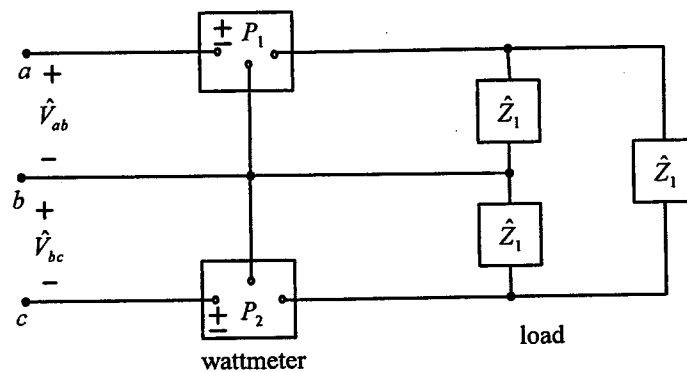
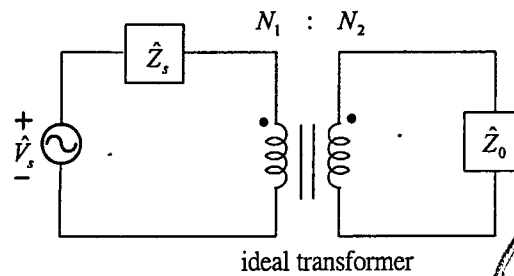


Fig. 2

3. Let $\hat{Z}_s = 52 + j30 \Omega$ and $\hat{Z}_0 = R_0 + j480 \Omega$ in Fig.3. Find the values of ideal transformer turn ratio $n = \frac{N_2}{N_1}$ and resistance R_0 needed to get maximum power transfer. (20 points)



ideal transformer

Fig. 3

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4. The switch in Fig.4 has been open for a long time before $t = 0$, so the capacitor has no initial stored energy when the switch closes at $t = 0$. Find the resulting step-response voltage $v_C(t)$ and current $i_C(t)$. (20 points)

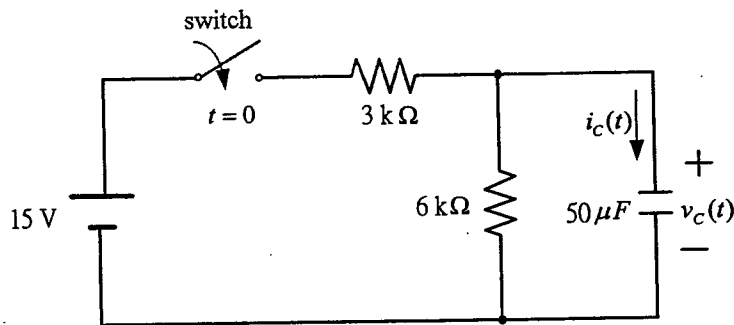


Fig. 4

5. Let the circuit connections as shown in Fig.5. Find V_1, V_2, I_1, I_2 , and I_3 . (20 points)

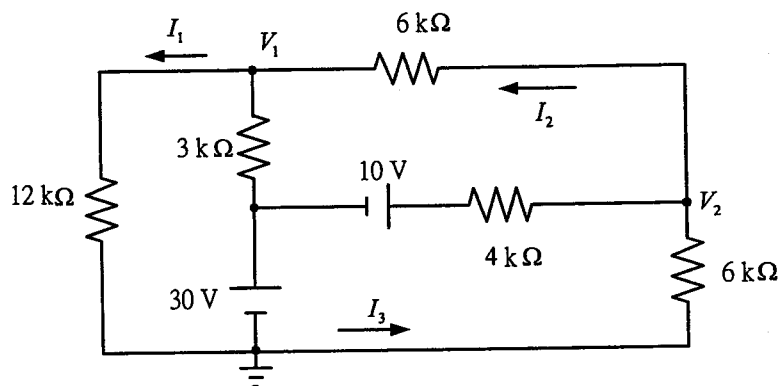


Fig. 5

