國立臺北科技大學 103 學年度碩士班招生考試

系所組別：1523 自動化科技研究所乙組
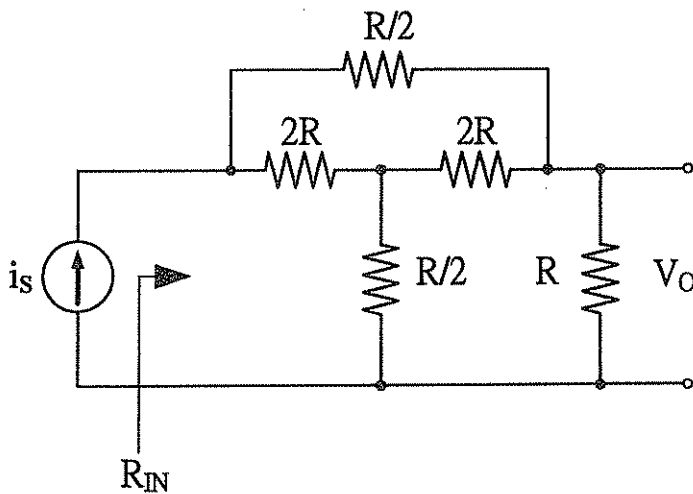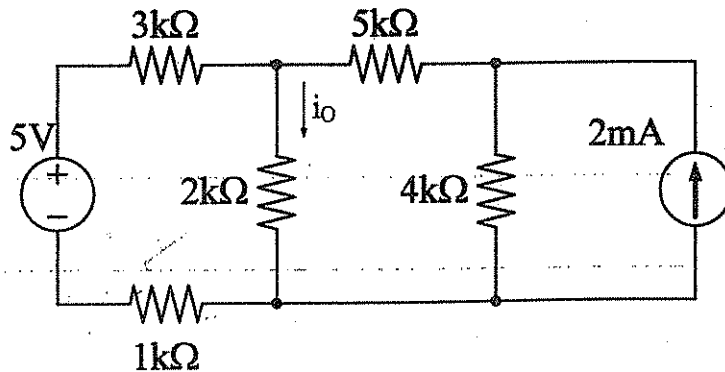
第三節　電路學　試題（選考）

注意事項：

1. 本試題共七題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
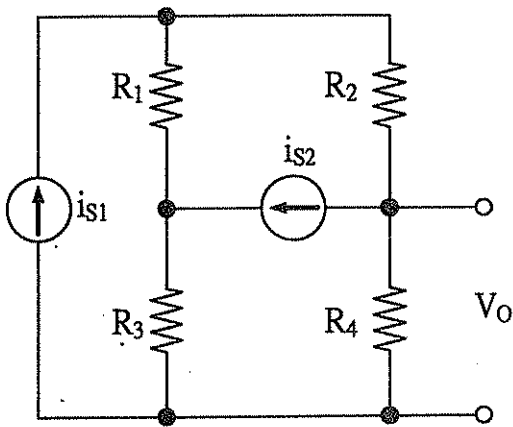3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

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1. For the circuit shown below, find the output voltage V_o and the input resistance R_{in} seen by the current source in terms of R.　(20%)
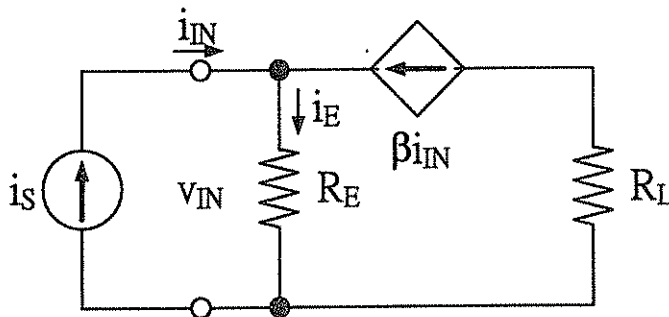

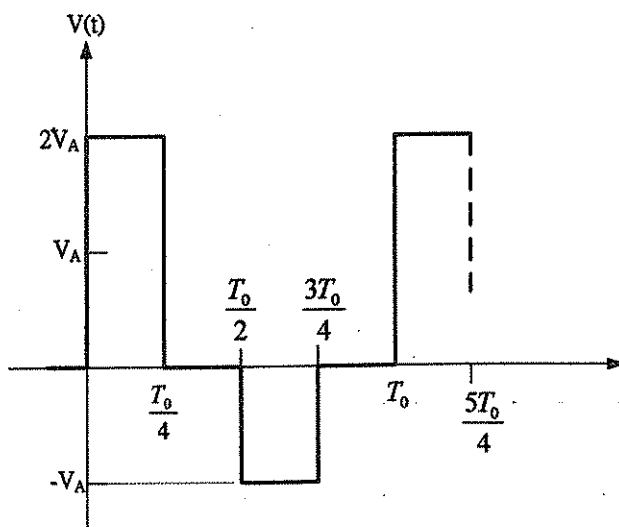2. For the circuit shown below, find the value of i_o.　(10%)

3. Find the value of V_0 in terms of i_{S1} and i_{S2} for the circuit shown below where $R_1=1\Omega$, $R_2=4\Omega$, $R_3=4\Omega$ and $R_4=10\Omega$. (10%)

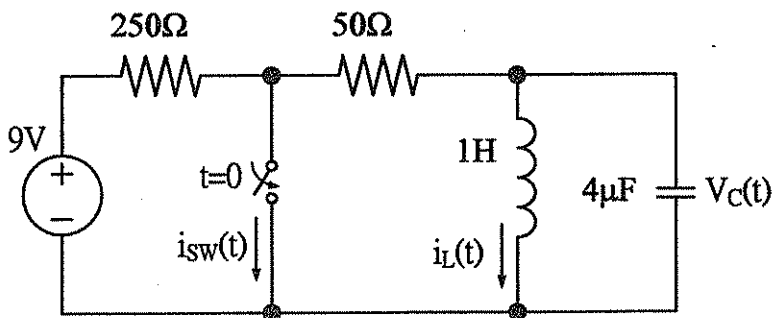4. Find the input resistance of the circuit shown below. (10%)

5. Find the average and RMS values of the periodic waveform shown below. (10%)

6. The switch shown in the circuit below has been open for a long time and is closed at t=0.

    1) Find the voltage across the capacitor and the current through the inductor just before t=0. (5%)

    2) Find the inductor current i_L for $t \geq 0$. (5%)

    3) Find the capacitor voltage V_c for $t \geq 0$. (5%)

    4) Find the current through the switch for $t \geq 0$. (5%)

7. The input impedance and the voltage of the voltage source, Vs, in the circuit shown below are $Z_s=j20\Omega$ and $V_s=2500\angle 0°V$ at 377 rad/s respectively. The transformer has $L_1=2H$, $L_2=0.2H$, and $M=0.6H$. The load impedance is $Z_L=25+j15\Omega$. Find I_A, I_B, V_1, V_2 and the average power delivered by the voltage source. (20%)