

國立宜蘭大學

102 學年度研究所碩士班考試入學

電路學試題

(電機工程學系碩士班)

准考證號碼：

《作答注意事項》

1. 請先檢查准考證號碼、座位號碼及答案卷號碼是否相符。
2. 考試時間：100 分鐘。
3. 本試卷共有五題，共計 100 分。
4. 請將答案寫在答案卷上。
5. 考試中禁止使用大哥大或其他通信設備。
6. 考試後，請將試題卷及答案卷一併繳交。
7. 本試卷採雙面影印，請勿漏答。
8. 本考科可使用非程式型（不具備儲存程式功能）之電子計算機。

1. For the circuit in Fig. 1, find I and I_1 . (20%)

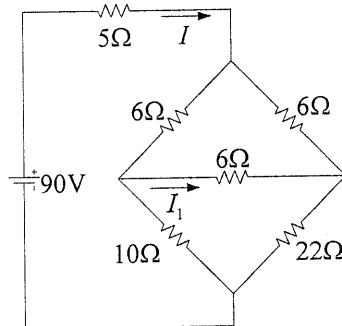


Fig. 1

2. For the circuit in Fig. 2,

- (a) Find the Thevenin equivalent circuit with respect to the terminals A, B . (15%)
 (b) Find the maximum average power delivered to R_L . (5%)

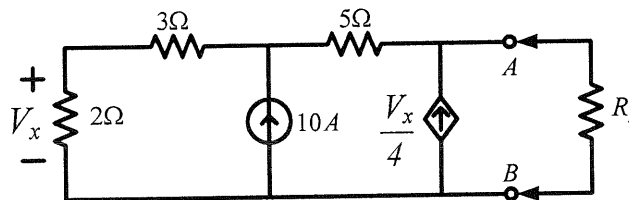


Fig. 2

3. Assume the OPA in the circuit of Fig. 3 is ideal in which $R = 10 \text{ K}\Omega$ and $C = 10 \mu\text{F}$.

- (a) Find the transfer function of $\frac{V_o(s)}{V_i(s)}$. Let $V_o(s)$ and $V_i(s)$ be Laplace transform of $v_o(t)$ and $v_i(t)$. (10%)
 (b) If the input voltage $v_i(t) = 10 \sin(t) \text{ V}$, find the steady-state response of $v_o(t)$. (10%)

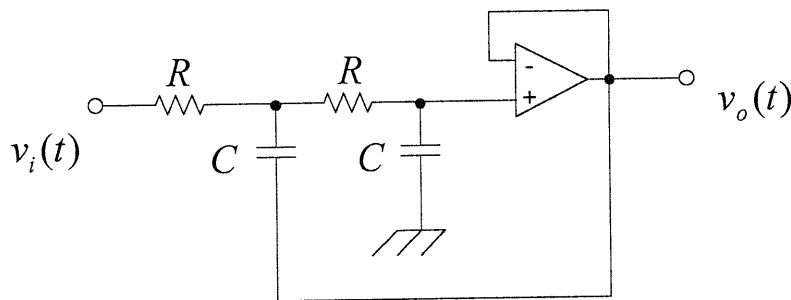


Fig. 3

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4. The switch moves from a to b at $t = 0$ second. Find the voltage $v(t)$ for $t \geq 0$. (20%)
 (PS: Before $t = 0$, the circuit has reached steady state.)

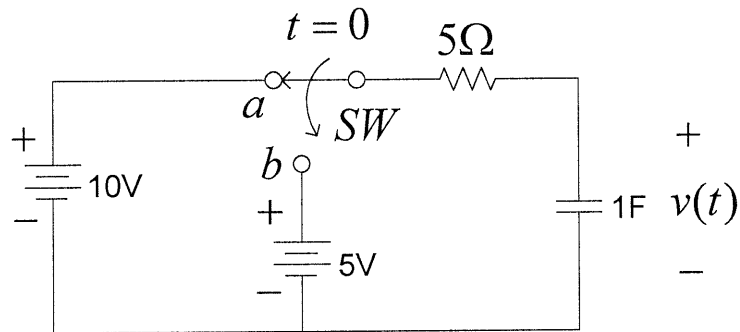


Fig. 4

5. For the circuit in Fig. 5, find the transfer function of $\frac{V_2(s)}{V_1(s)}$. Let $V_1(s)$ and $V_2(s)$ be Laplace transform of V_1 and V_2 . (20%)

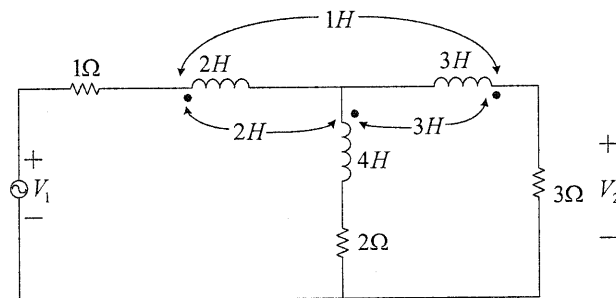


Fig. 5