

國立臺北科技大學產業研發碩士專班 96 年度秋季班招生考試

系所組別：142 光電與通訊產業研發碩士專班

第一節 電子學 試題

第一頁 共三頁

**注意事項：**

1. 本試題共五題，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。

一、Assume the operational amplifiers are ideal.

1. For the circuit shown in Fig. 1(a), Find the  $Z_i$ . (10%)

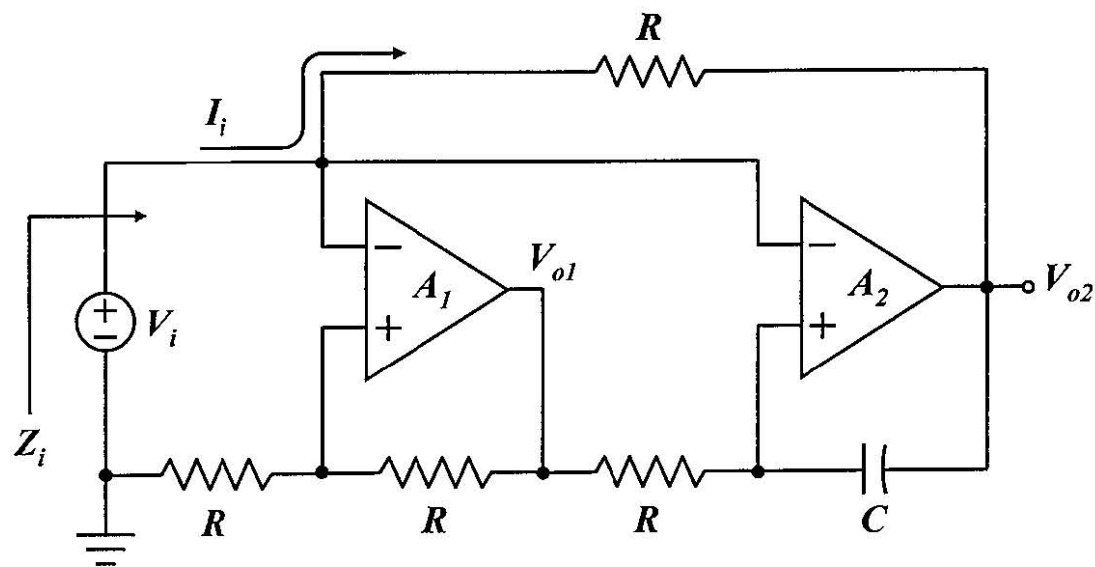


Fig. 1(a)

2. For the circuit shown in Fig. 1(b), Find the  $Z_{in}$ . (10%)

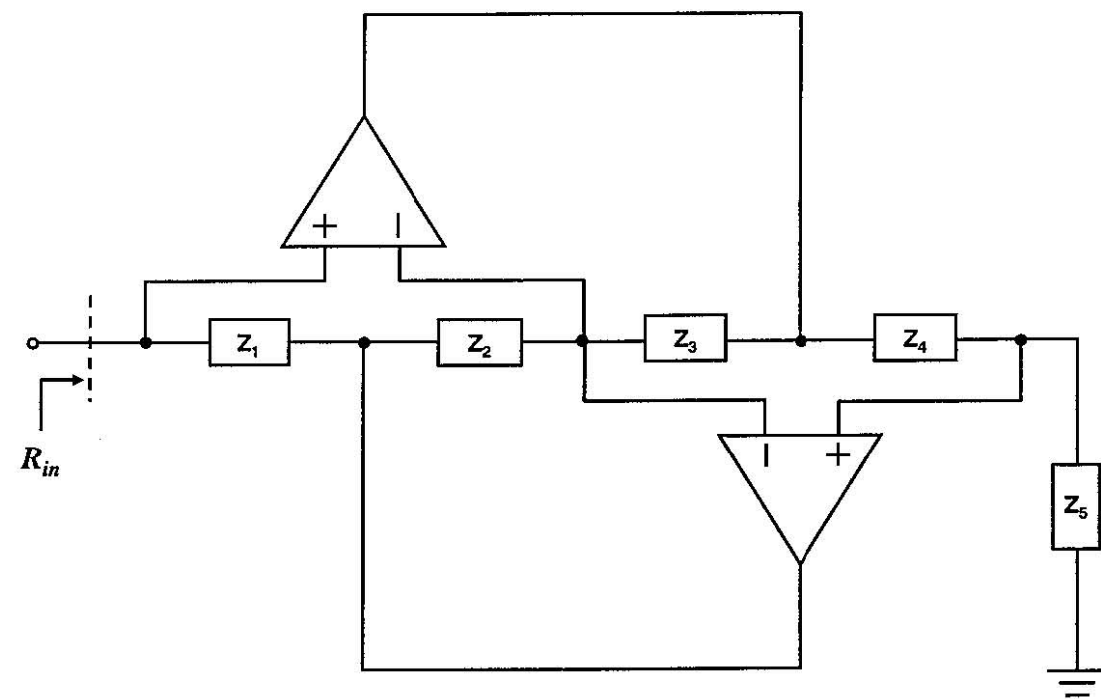


Fig. 1(b)

二、Assume the operational amplifiers are ideal.

1. For the circuit shown in Fig. 2(a), Find and plot the transfer characteristic  $V_o$  as a function of  $V_i$ . (5%)

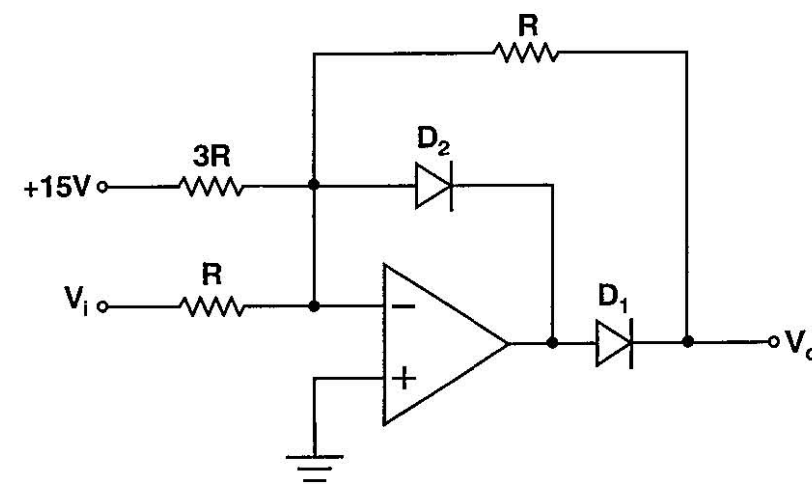


Fig. 2(a)

注意：背面尚有試題

4-3

2. For the circuit shown in Fig. 2(b), Find the  $V_o$ . (5%)

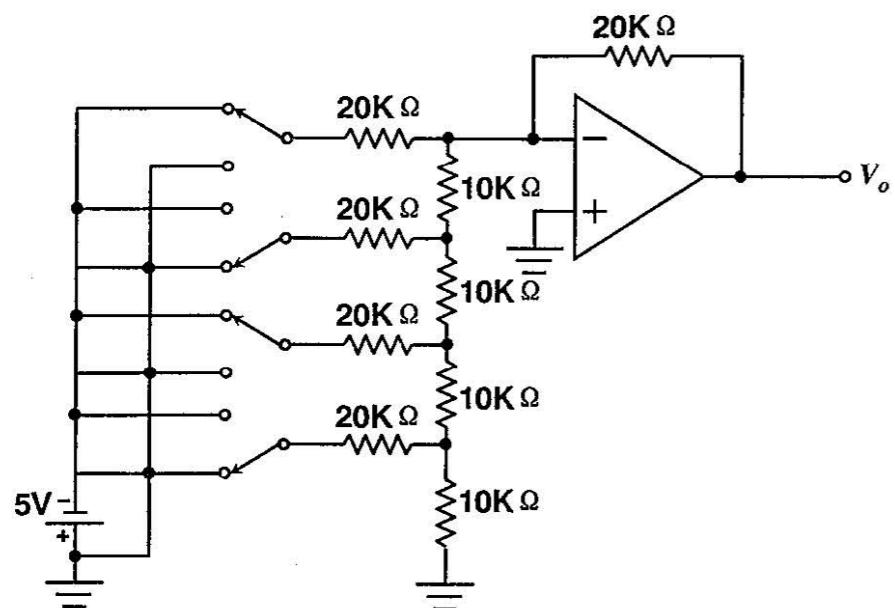


Fig. 2(b)

3. For the circuit shown in Fig. 2(c), find the voltage of X. (5%)

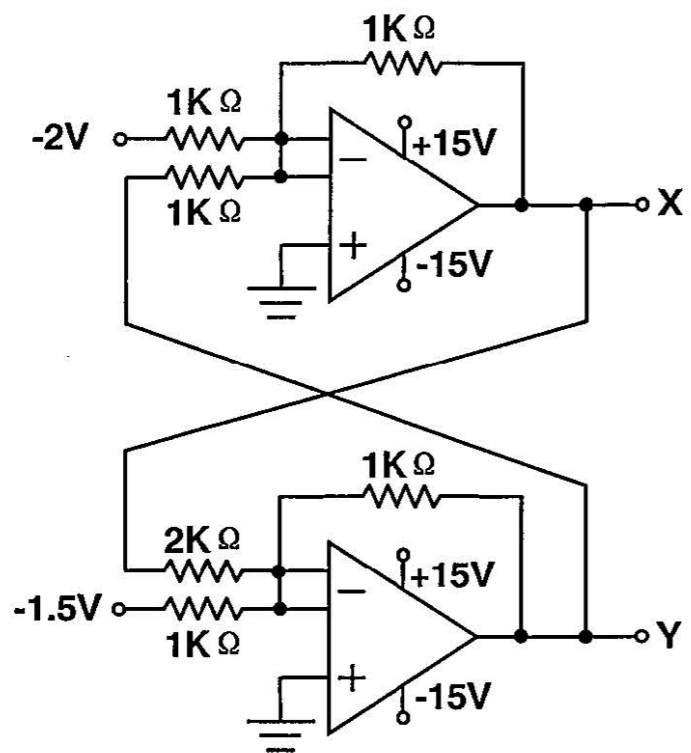


Fig. 2(c)

4. For the circuit shown in Fig. 2(d), find the  $I_o$ . (5%)

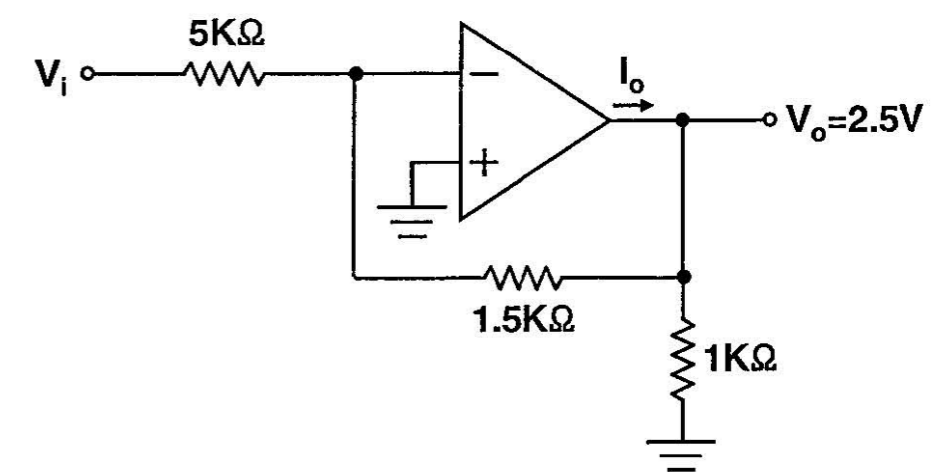
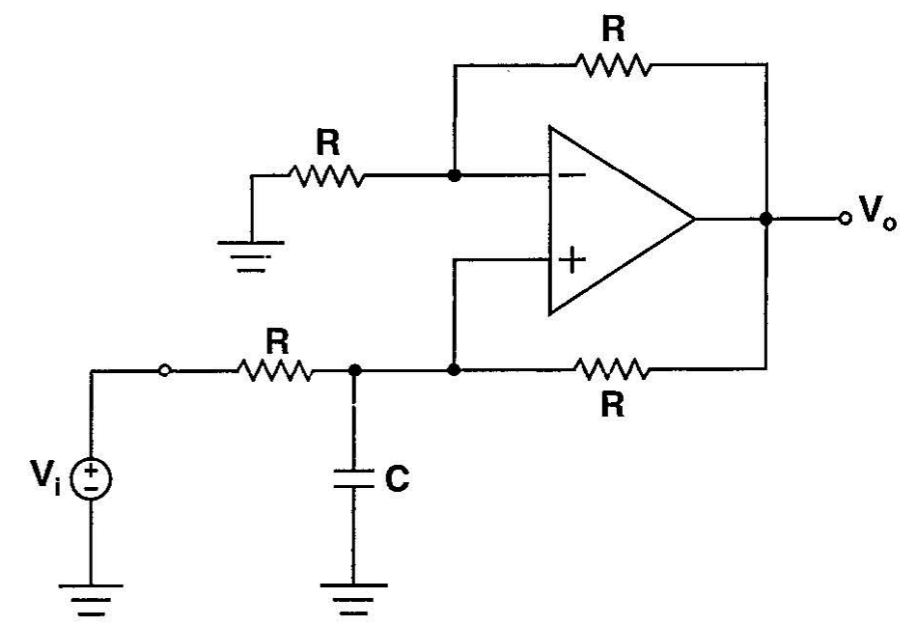


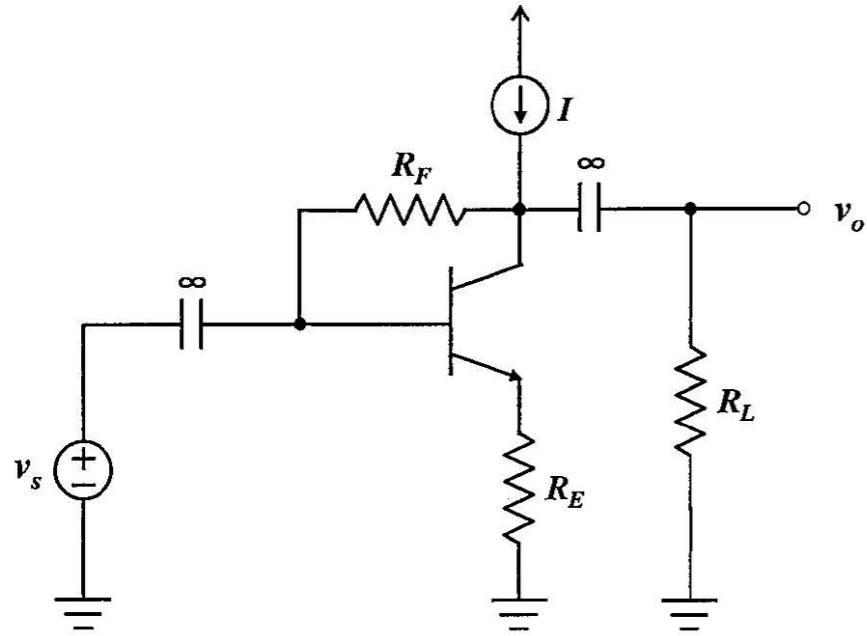
Fig. 2(d)

三、 For the circuit shown below, assume the operational amplifiers are ideal.



1. Prove the  $\frac{V_o}{V_i} = \frac{2}{sRC}$ . (10%)
2. Design two different circuits to satisfy the  $\frac{V_o}{V_i} = \frac{2}{sRC}$ 
  - (1) Use two operational amplifiers. (5%)
  - (2) Only use one operational amplifier. (5%)

四、For the circuit shown below, Calculate the  $\frac{v_o}{v_s}$ . ( $\beta=100, R_F=100k\Omega, R_E=1k\Omega, R_L=100k\Omega, I=1mA$ ) (20%)



五、For the circuit shown below, find  $R_{in}$ ,  $R_{out}$  and  $A_v$ . (20%)

