

國立臺北科技大學 114 學年度碩士班招生考試

系所組別：1502 自動化科技研究所

第二節 電子學 試題 (選考)

第 1 頁 共 2 頁

注意事項：

1. 本試題共 6 題，共 100 分。
2. 不必抄題，作答時請將試題題號及答案依照順序寫在答案卷上。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Assuming the op amp is ideal in Fig. 1, determine as follows: (15% in total)

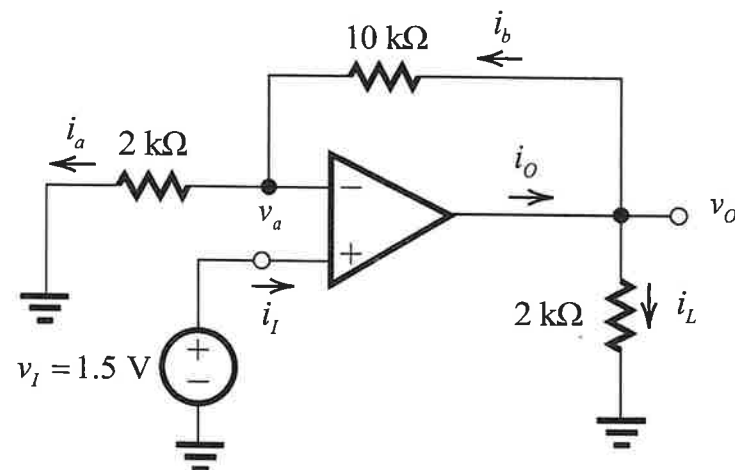
(1) i_a , i_b , i_I . (6%)(2) the voltage gain $\frac{v_o}{v_i}$, current gain $\frac{i_L}{i_I}$, and power gain $\frac{P_L}{P_I}$. (9%)

Fig. 1

2. Design a low-pass amplifier using an ideal op amp. Based on the conditions: an input resistance of 150 kΩ, a dc gain of 40 dB and 3-dB frequency of 8kHz. (15% in total)

3. Fig. 2 and 3 using ideal diodes, determine V_L and I_L . (10% in total; 5% for each)

(1)

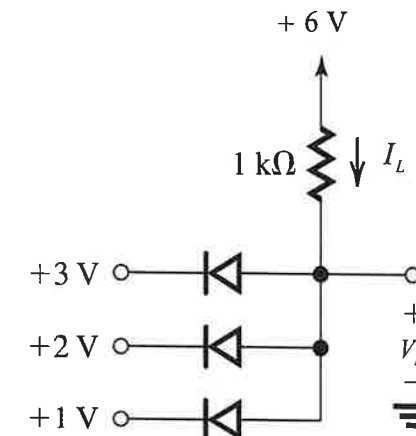


Fig. 2

(2)

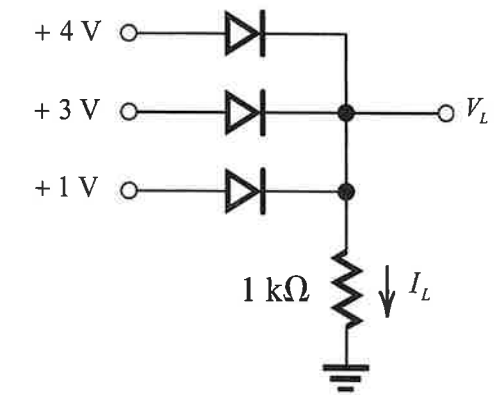


Fig. 3

4. In Fig. 4, the transistor used has $\beta_o = 150$, $r_\pi = 1 \text{ k}\Omega$ and $r_o \rightarrow \infty$. (20% in total)(1) Determine the lower 3-dB frequency f_L . (10%)(2) Given the input current $i(t)$ is a 250 Hz square wave, determine the percentage tilt in the output. (5%)

(3) What is the lowest frequency square wave which will suffer less than 1 percent tilt? (5%)

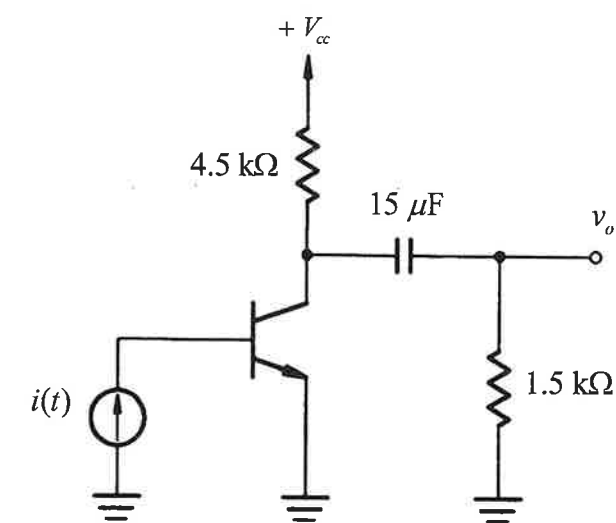


Fig. 4

注意：背面尚有試題

5. Fig. 5 shown the ideal class B push-pull amplifier and is required to deliver an average power of 120W into the load $R_L = 15 \Omega$. The power supply V_{cc} is 3V greater than the corresponding peak sine wave output voltage. Please determine the power supply V_{cc} . (20% in total)

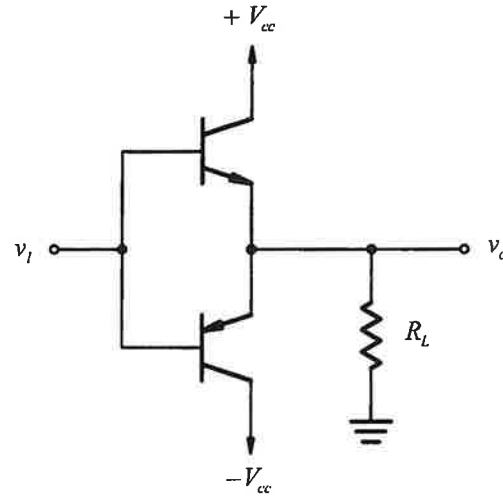


Fig. 5

6. Assuming the op amp is ideal in Fig. 6. Determine the output V_o . (20% in total)

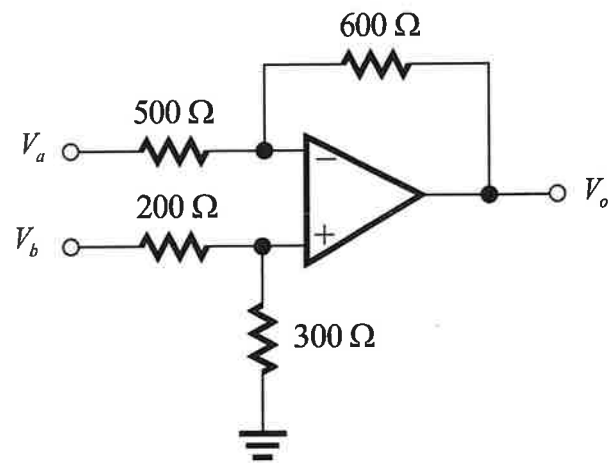


Fig. 6