

國立宜蘭大學
九十八學年度轉學招生考試

(考生填寫)
准考證號碼：

電子學試題

《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：80 分鐘。
3. 本試卷共有七題，共計 100 分。
4. 請將答案寫在答案卷上。(限用藍或黑色鋼筆、原子筆作答)
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。

1. Find the closed-loop gain v_O/v_I of the circuit shown in **Fig. 1**. Assuming the op amp to be ideal. (10 points)
2. Find the output voltage v_O in terms of the input voltages v_1 and v_2 for the circuit in **Fig. 2**. (10 points)
3. For the circuit shown in **Fig. 3**, find the values of the labeled voltages and currents. Assume diodes are ideal. (10 points)
4. Explain the following keyword, (a) Zener diode, (b) LED, (c) CMOS, (d) body effect. (20 points)
5. As shown in **Fig. 4**, find the voltages (V_C, V_B, V_E) at all nodes and the current (I_C, I_B, I_E) at all branches. Assume $\beta = 100$. (10 points)
6. Find the voltage gain (v_o/v_i) of the circuit shown in **Fig. 5**. Assume $\beta = 100$. (20 points)
7. For the circuit in **Fig. 6**, determine the voltages (V_{GS}, V_D) and the currents (I_D, I_G). Assume $V_t = 1$ V and $k'n(W/L) = 1$ mA/V², $\lambda = 0$. **THE formula of saturation current is given in Fig. 6.** (20 points)

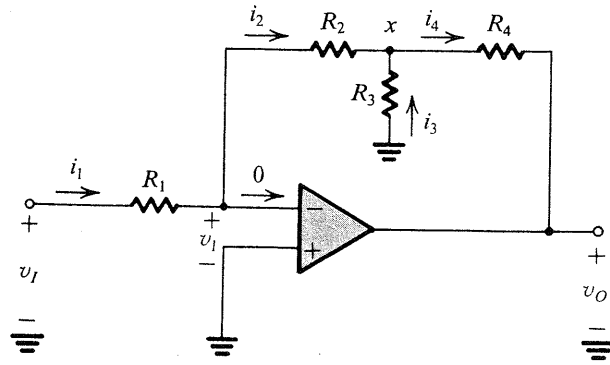


Fig. 1

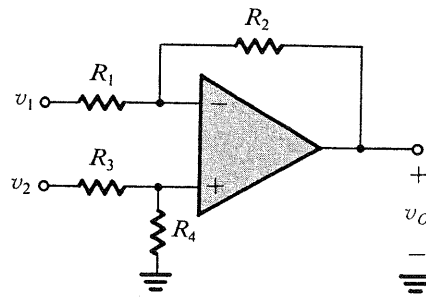


Fig. 2

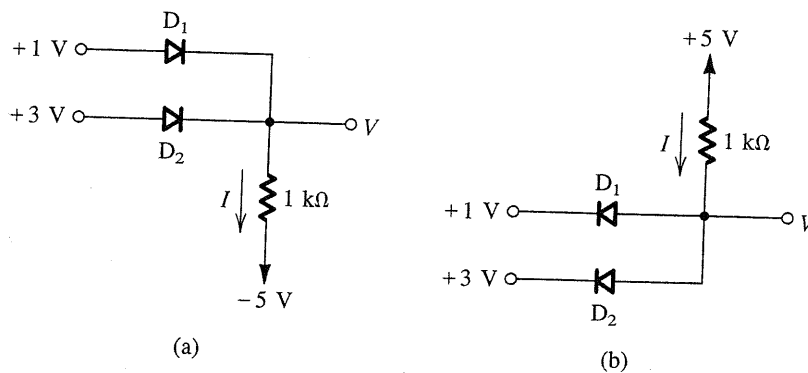


Fig. 3

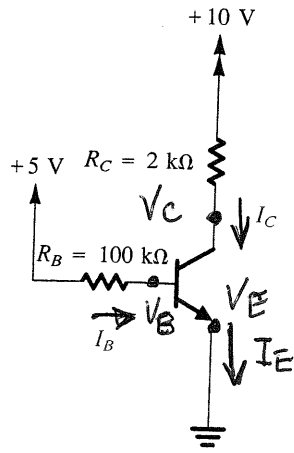


Fig. 4

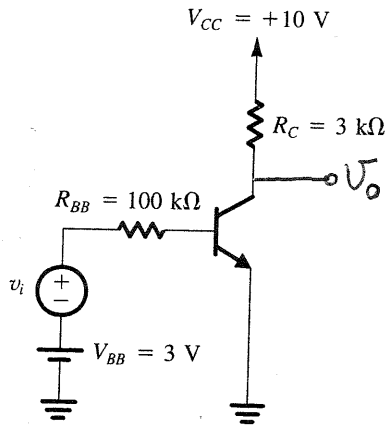
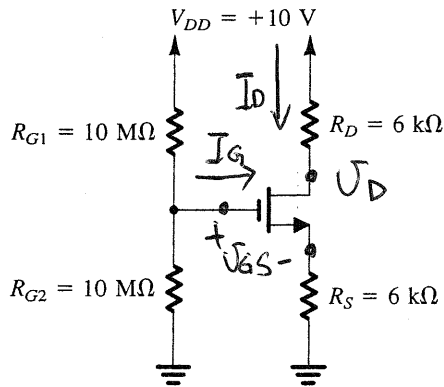


Fig. 5



$$i_D = \frac{1}{2} k'_n \frac{W}{L} (v_{GS} - V_i)^2$$

Fig. 6