

所別： 光電類

共 2 頁 第 1 頁

科目： 電子學

本科考試可使用計算器，廠牌、功能不拘

本試題共三大計算題。（計算題應詳列計算過程，無計算過程者不予計分）

1. Refer to Fig. 1

10% (a) Find I_1 under very large A_{OL}

10% (b) Give a more exact expression for I_1 .

5% (c) Find the voltage compliance range of the collector voltage of Q_1 .

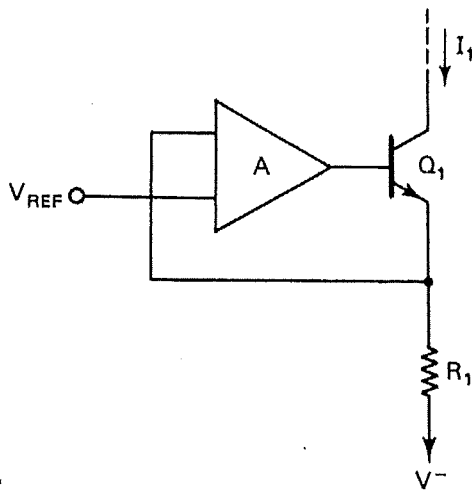


Fig. 1:

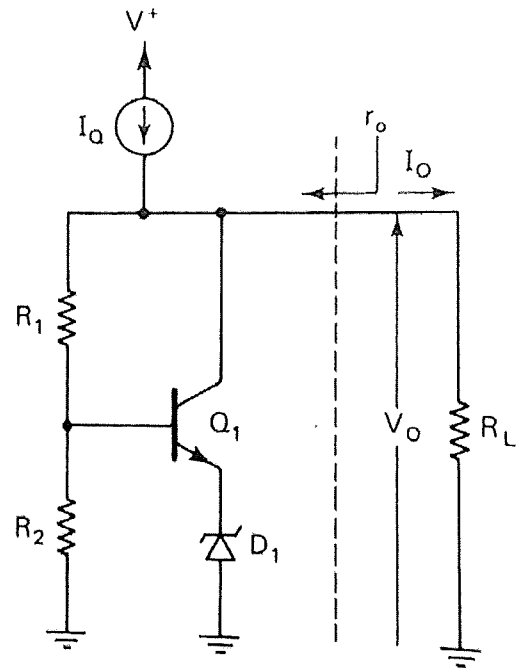


Fig. 2:

2. Refer to Fig. 2. $I_Q = 12\text{mA}$, $I_{R1} = I_{R2} = 1.0\text{mA}$, $V_Z = 6.3\text{V}$,
and $Z_Z (\equiv dV_Z/dI_Z) = 10\Omega$.

10% (a) Find R_1 , and R_2 for $V_O = 10\text{V}$.

5% (b) Find the current compliance range of I_O .

10% (c) Find the dynamic output resistance r_o .

注意:背面有試題

國立中央大學 114 學年度碩士班考試入學試題

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3. Consider the circuit shown in Fig. 3. The parameters are $\beta=180$, and the Early voltage $V_A = \infty$, $v_{o1}=v_{o2}=2$ V and $v_{o4}=6$ V when $v_1=v_2=0$ V.

5% (a) Determine the values of V_1 and V_2 ;

5% (b) Determine the value of I_R ;

5% (c) Determine the values of I_1 and I_2 , and explain the reason in details;

5% (d) Determine the value of R_{C1} ;

5% (e) Determine the value of R_{c2} ;

5% (f) Determine the voltage gain $A_v \equiv \frac{v_{o4}}{v_2}$;

10% (g) Determine the differential-mode voltage gain $A_{d1} \equiv \frac{(v_{o1} - v_{o2})}{(v_1 - v_2)}$;

10% (h) Determine the differential-mode voltage gain $A_d \equiv \frac{v_{o4}}{(v_1 - v_2)}$.

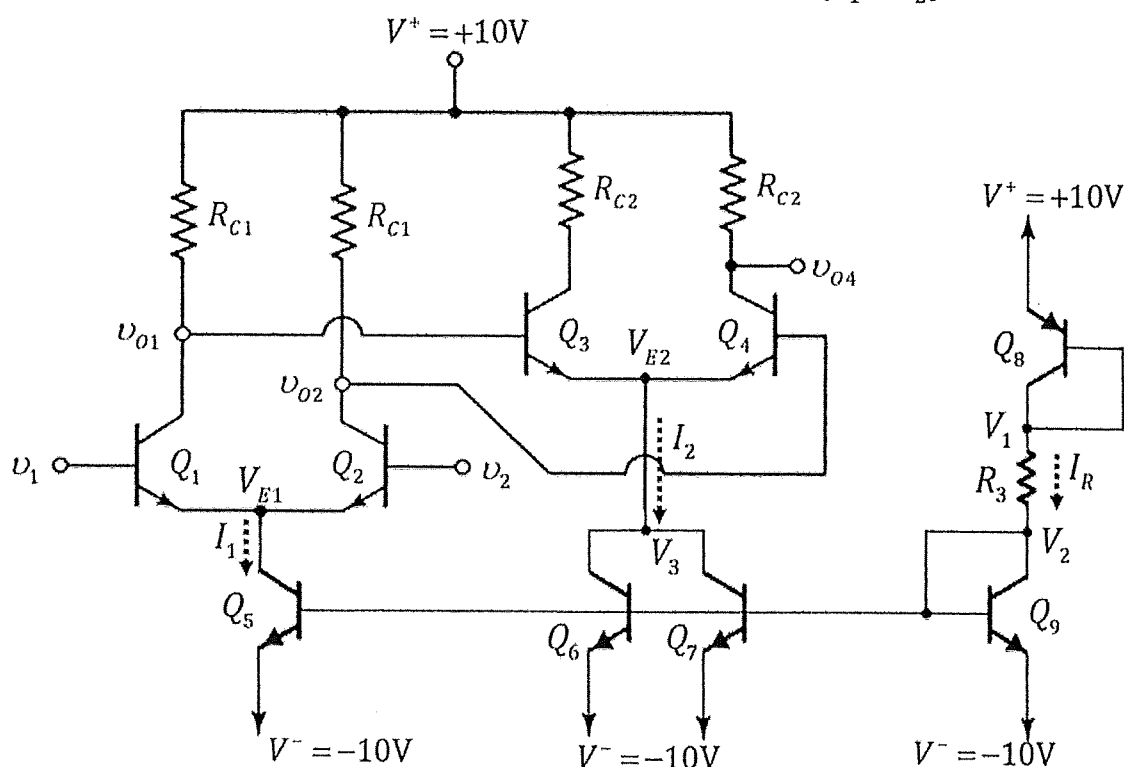


Fig. 3:

注意：背面有試題