所別： <u>電子學</u> 組別： <u>通訊系統組</u> 科目： <u>電子學</u>

注意：☐不准☐一般計算器■工程用計算器，考試時間總計：100 分鐘。試題共 2 頁，第 1 頁

每題 20 分，共 100 分

1. In the circuit of Fig. 1. V_{in} has a nominal value of 5V, $R_1 = 100\Omega$, and D_2 has a reverse breakdown of 2.7V and a small-signal resistance of 5Ω. Assuming $V_{D,on} \approx 0.8V$ for D_1, determine the line and load regulation of the circuit.
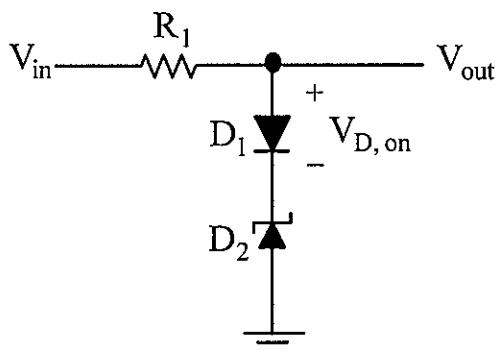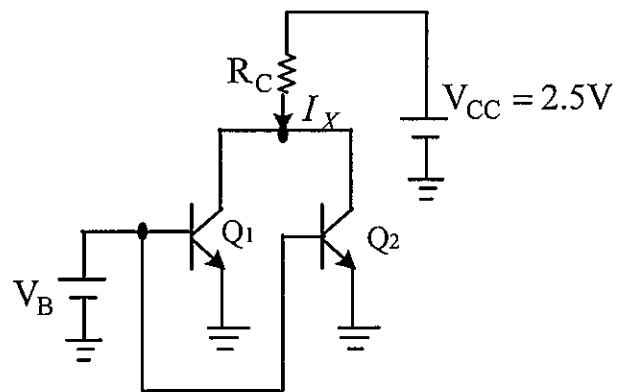

Fig. 1.

Fig. 2.

2. Consider the circuit shown in Fig. 2.

(a) If $I_{S1} = 2I_{S2} = 5 \times 10^{-16} A$, determine V_B such that $I_X = 1.2mA$.

(b) What value of R_C places the transistors at the edge of the active mode?

3. Determine the voltage gain, input and output impedances of the circuit shown in Fig. 3. Assume a very large value for C and neglect the Early effect.
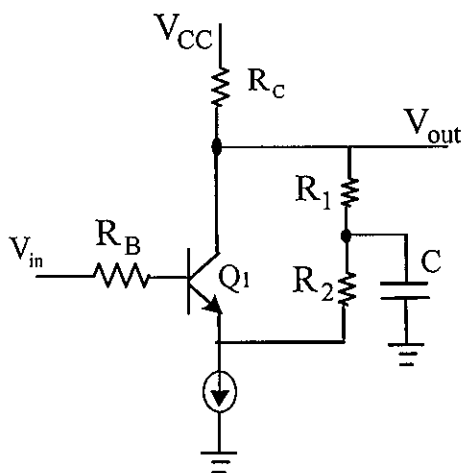

Fig. 3.

～背面尚有試題～

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4. Assuming the open-loop gain of the operational amplifier $A_0 = \infty$, compute the closed-loop gain of the inverting amplifier shown in Fig. 4.
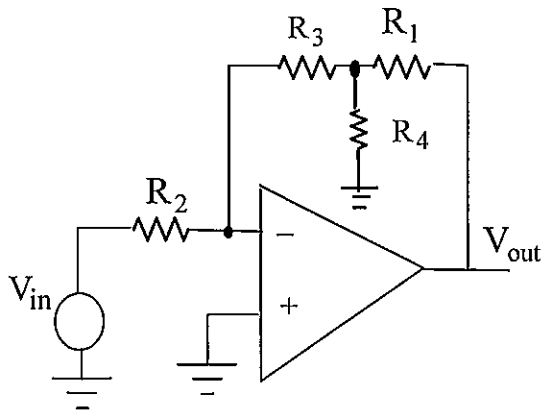

Fig. 4.

5. Determine the voltage gain of the degenerated differential pairs shown in Fig. 5. Assume the Early voltage $V_A = \infty$.
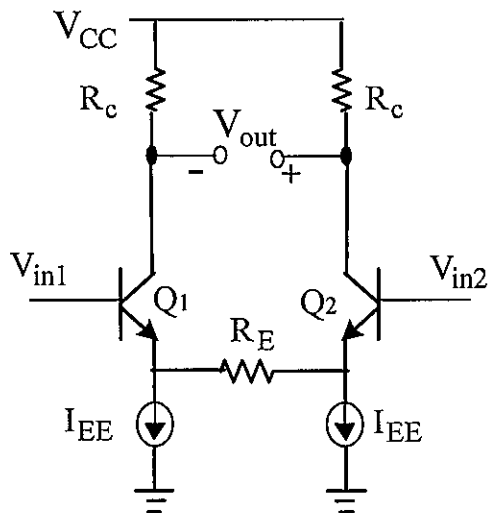

Fig. 5.