淡江大學 103 學年度進修學士班轉學生招生考試試題

9-1

系別：電機工程學系三年級　　科目：電　子　學

考試日期：7 月 18 日(星期五) 第 3 節　　本試題共 6 大題， 2 頁

本試題雙面印刷

1. 20% Consider a *pn* junction in forward bias.
   (a) To obtain a current of 1.5mA with a voltage of 750mA, how should I_S be chosen?
   (b) If the diode cross section area is now tripled, what voltage yields a current of 1.5mA?

2. 20% Assuming a constant-voltage diode model with $V_D = V_{D,on}$ in forward bias condition with the circuit as shown in Fig. 2,
   (a) plot V_{out} as a function of I_n, and
   (b) plot V_{out} as a function of time if $I_n = I_0 \sin\omega t$ with a relatively large I_0.

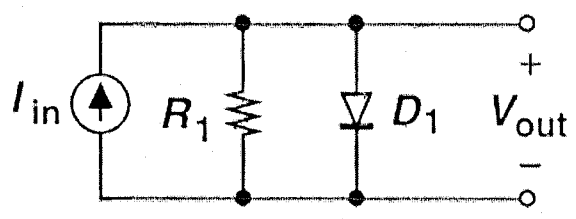

Fig. 2

3. 10% Determine the operating point of Q_1 of the circuits shown in Fig. 3. Assume $I_S = 3 \times 10^{-17}$ A, $\beta = 100$, and $V_A = \infty$.

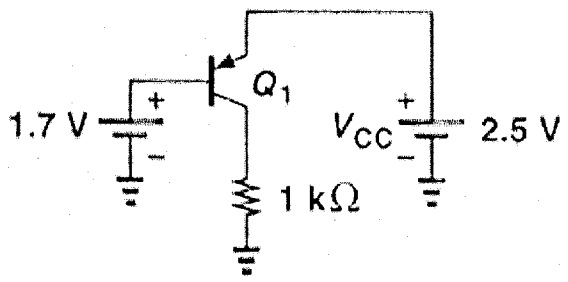

Fig. 3

4. 20% Compute the bias point of the circuits depicted in Fig. 4. Assume $I_S = 6 \times 10^{-16}$ A, $\beta = 100$, and $V_A = \infty$.

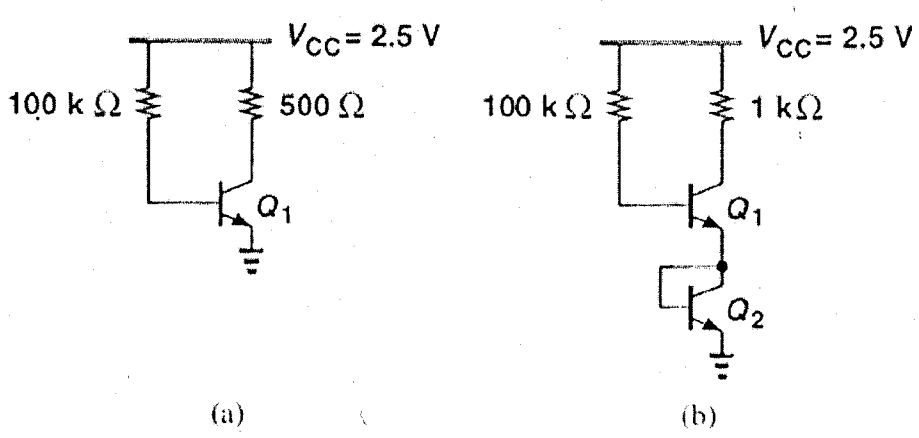

Fig. 4

背面尚有試題

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9-2

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5. 10% Draw the small signal equivalent circuit of Fig. 5 by using the π-model.

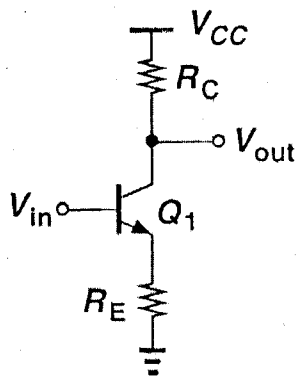

Fig. 5

6. 20% Calculate v_{out}/v_{in} for the circuit depicted in Fig. 6. Assume $I_S = 8 \times 10^{-16}$ A, $\beta = 100$, and $V_A = \infty$. Also assume the capacitor, C_1, is very large.

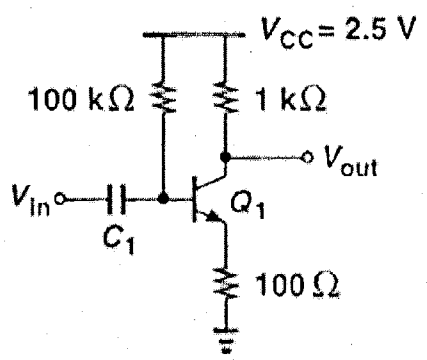

Fig. 6