淡江大學 97 學年度轉學生招生考試試題

系別：電機工程學系三年級　　科目：電　子　學

可否使用計算機			
可	V	否	

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1. 10% Beginning with $V_{D,on} = 0.8V$ for each diode, determine the change in V_{out} if V_{in} changes from +2.4V to +2.5V for the circuit shown in Fig. 1.

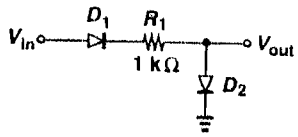

Fig. 1

2. 20% In the circuit of Fig. 2, $\beta = 100$ and $V_A = \infty$.
   (a) If the collector current of Q_1 is equal to 0.5mA, calculate the value of I_S.
   (b) If Q_1 is biased at the edge of saturation, calculate the value of I_S.

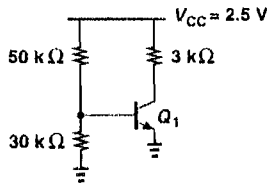

Fig. 2

3. 20% Calculate V_{out}/V_{in} for the circuit shown in Fig. 3. Assume $I_S = 8\times10^{-16}$A, $\beta = 100$, and $V_A = \infty$. Also assume the capacitors are very large.

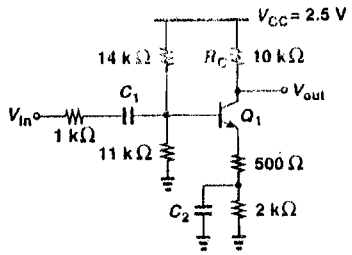

Fig. 3

4. 20% Consider the circuit shown in Fig. 4, where $(W/L)_1 = 10/0.18$ and $(W/L)_2 = 30/0.18$. If $\lambda = 0.1V^{-1}$ and $\mu_n C_{ox} = 200\times10^{-6}A/V^2$, calculate V_B such that $V_X = 0.9V$.

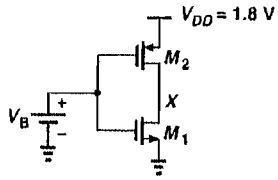

Fig. 4

本試題雙面印製

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5. 20% The CS stage depicted in Fig. 5 must achieve a voltage gain of 15 at a bias current of 0.5mA. If $\lambda_1 = 0.15V^{-1}$, $\lambda_2 = 0.05V^{-1}$, and $\mu_n C_{ox} = 200\times10^{-6}A/V^2$, determine the required value of $(W/L)_2$.

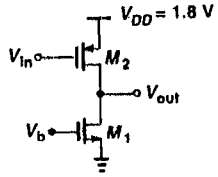

Fig. 5

6. 10% Calculate V_{out} in terms of V_{in} for the circuit shown in Fig. 6.

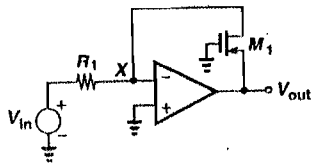

Fig. 6