淡江大學 99 學年度進修學士班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

本試題雙面印刷

1.　15% Fig. 1 shows a parallel resistor-diode combination. IF $I_S = 3 \times 10^{-16}$A, calculate V_{D1} for I_X = 1mA, 2mA, and 4mA.
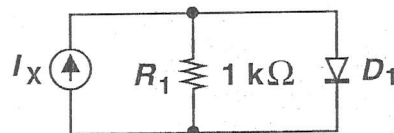

Fig. 1

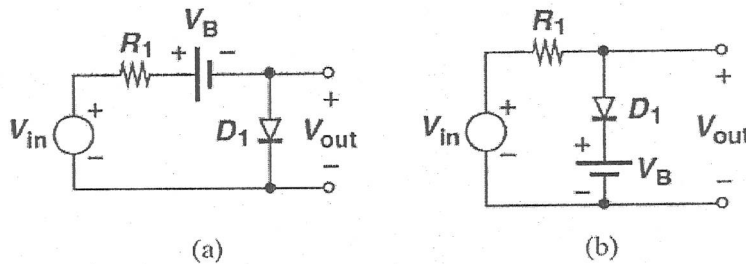2.　20% Plot the input/output characteristics of the circuits shown in Fig. 2 using an ideal model for the diodes.

(a)　　　　　　　　(b)

Fig. 2

3.　15% Consider the circuit shown in Fig. 3, where $I_S = 5 \times 10^{-16}$A and $V_A = \infty$. If V_B is chosen to forward-bias the base-collector junction by 200mV, what is the collector current?

Fig. 3
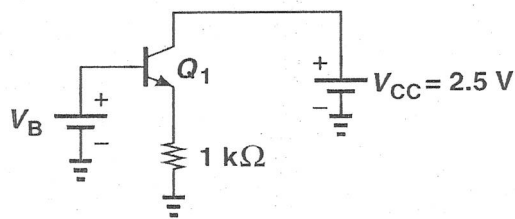
4.　15% What are
(a) Common collector amplifier?
(b) Common base amplifier?
(c) Emitter follower?

5. 10% Determine the voltage gain of Fig. 5. Assume $I_S = 7 \times 10^{-16}$A, $\beta = 100$, and $V_A = 5$V. (But for bias calculation, assume $V_A = \infty$). Also, assume the capacitors are very large.
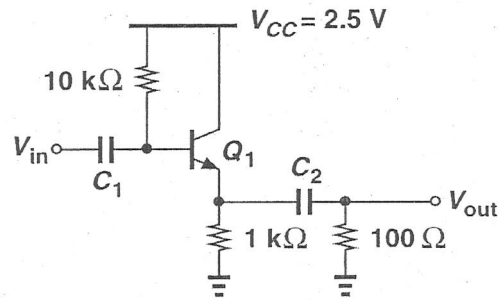

Fig. 5

6. 10% Compute the value of W/L for M_1 in Fig. 6 for a bias current of I_1. Assume $\lambda = 0$. For NMOS, $\mu_n C_{ox} = 200 \mu A/V^2$, $V_{TH} = 0.4$V.
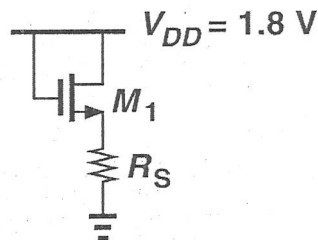

Fig. 6

7. 15% What are
   (a) Common source amplifier?
   (b) Common gate amplifier?
   (c) Source follower?