

淡江大學 100 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

73-1

考試日期：7月19日(星期二) 第1節

本試題共 5 大題， 2 頁

本試題雙面印刷

1. 20% The diode shown in Fig. 1 is with $I_S = 2 \times 10^{-15} \text{ A}$. Calculate V_{D1} and I_X for $V_X = 0.5 \text{ V}$ and 1.2 V , respectively.

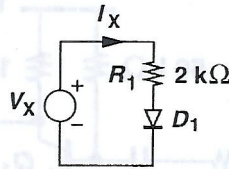


Fig. 1

2. 20% Beginning with $V_{D,on} \approx 800 \text{ mV}$ for the diode, calculate the change in V_{out} if I_{in} changes from 3 mA to 3.1 mA in Fig. 2.

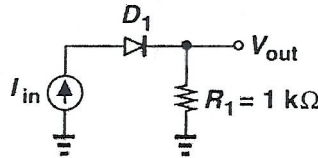


Fig. 2

3. 20% Determine the collector current of Q_1 in Fig. 3 if $I_S = 2 \times 10^{-17} \text{ A}$ and $\beta = 100$.

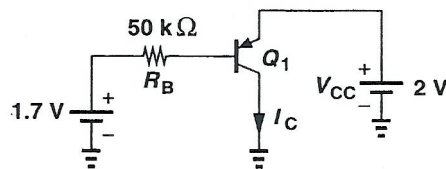
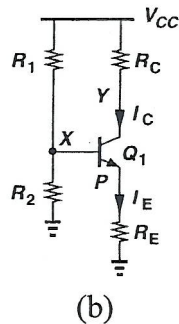
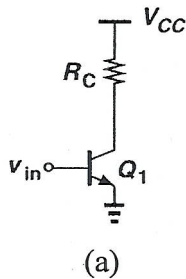


Fig. 3

4. 20% Draw the small signal circuits of:



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5. 20% Calculate v_{out}/v_{in} for the circuit depicted in Fig. 5. Assume $I_S = 8 \times 10^{-16} \text{ A}$, $\beta = 100$, and $V_A = \infty$. Also assume both capacitors are very large.

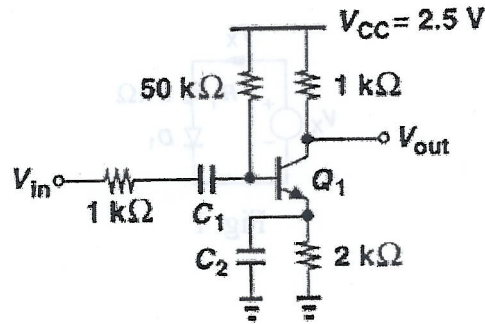


Fig. 5



Fig. 2

3. 20% Determine the collector current of Q_1 in Fig. 3 if $\beta = 2 \times 10^3$ and $R = 100 \Omega$.

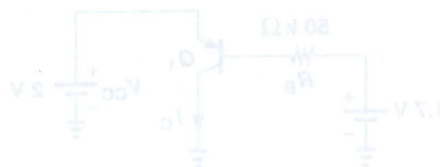
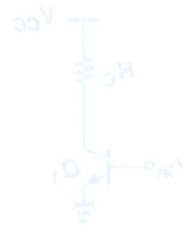


Fig. 3

4. 20% Draw the small-signal circuit of



(d)



(a)