

元智大學 107 學年度 轉學考 招生試題卷

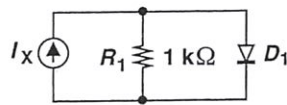
系(所)別：電機工程學系學士班 組別：電機工程學系乙組3年級 科目：電子學

用紙第 / 頁共 2 頁

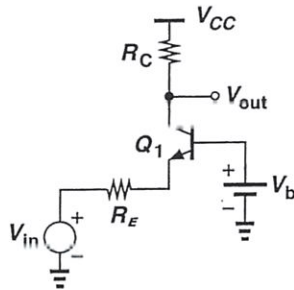
● 不可使用電子計算機

一 選擇題 (單選題) (70%)

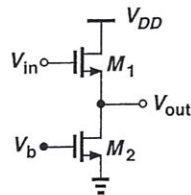
- What is the doped atom to make N-type silicon semiconductor ?
(A) Ge (B) B (C) As (D) Si 10%
- Consider the circuit shown in the following figure, where $I_{D1} = 0.5mA$, $R_1 = 1K\Omega$. Calculate the current I_x with constant voltage model of the diode ($V_{DON} = 0.7V$).
 I_{D1} is (A) $1mA$ (B) $1.2mA$ (C) $1.4mA$ (D) $1.6mA$. 10%



- A common-base amplifier shown below is biased at a collector current I_C of $1.3mA$. The $R_C = 500\Omega$, $R_E = 30\Omega$, $V_T = 26mV$ and $\beta = 100$. $I_C = I_S \exp(V_{BE}/V_T)$
The voltage gain of this amplifier is (A) 10 (B) 16.6 (C) 26 (D) 52. 10%



- In problem 3, the input impedance of this amplifier is
(A) 30Ω (B) 50Ω (C) 260Ω (D) $\infty \Omega$ 10%
- A source follower amplifier is shown below. The transconductance of the NMOS(M_1 and M_2) is g_m . The impedance between drain and source is r_o . The voltage gain of this amplifier is
(A) g_m (B) $g_m r_o$ (C) $1/g_m$ (D) 1 10%



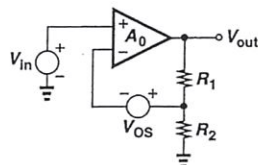
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用紙第2頁共2頁

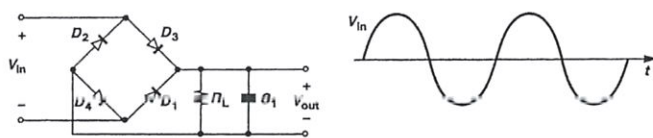
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6. In problem 5, the output impedance of this amplifier is (A) $\infty \Omega$ (B) g_m (C) r_o (D) $1/g_m$. 10%
7. The OP-based amplifier is shown below. The V_{out} of this amplifier is
 (A) $-(R_1/R_2)(V_{in} + V_{os})$ (B) $-(R_1/R_2)(V_{in} - V_{os})$ (C) $(1 + R_1/R_2)(V_{in} + V_{os})$ (D) $-1 + R_1/R_2)(V_{in} - V_{os})$ 10%

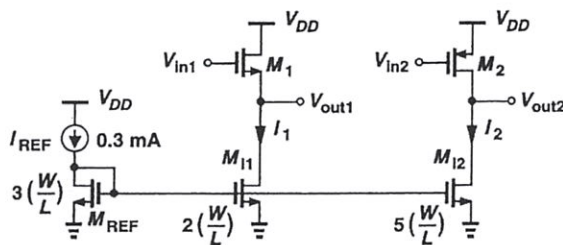


二 問答題 (30%)

8. Assuming a constant-voltage mode ($D_{on} = 0.7 V$) for the diodes, plot the output voltage waveform of a full-wave rectifier. Explain how to work of this circuit. 10%



9. An integrated circuit employs the source follower and the common-source stage with current mirrors shown below. What are the copy current I_1 and I_2 . 10%



10. There are three negative feedback systems and their Bode-plot figures of open loop gain are shown as follows. Which are the stable systems? Explain the reasons. 10%

