

國立彰化師範大學 101 學年度碩士班招生考試試題

系所： 電機工程學系

科目： 電子學

☆☆請在答案卷上作答☆☆

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1. 名詞解釋 (1) LED、(2) LCD、(3) Junction Capacitor。 (15%)
2. 求圖 1 中之 I_o 與 V_o 。 (14%)
3. 假設圖 2 中 $V_i(t)=14.14\sin 628t$ ，請繪出圖 2 中 a、b、c 點對 G 點之電壓波形。 (21%)

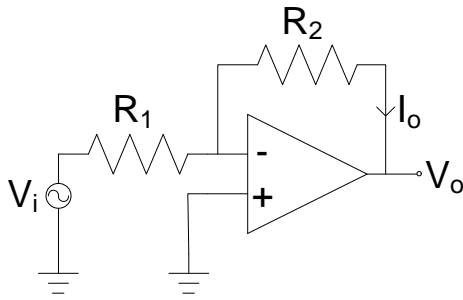


圖 1

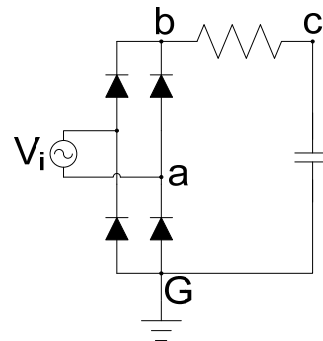


圖 2

4. Consider the circuit with an infinite-gain op amp shown in Fig. 3, if $R_1 = R_2 = R$, $C_4 = C$, and $C_3 = C/16$. please
 - (a) derive the transfer function $V_o(s)/V_i(s)$. (15%)
 - (b) find out the pole frequency ω_o and pole quality factor Q . (10%)
5. Fig. 4 shows a feedback transconductance amplifier implemented using an op amp with open-loop gain μ , a very large input resistance, and an output resistance r_o . The output current I_o that is delivered to the load resistance R_L is sensed by the feedback network composed of three resistances R_M , R_1 and R_2 , and a proportional voltage V_f is fed back to the negative-input terminal of the op amp.
 - (a) Find expressions for $A \equiv I_o/V_s$, $\beta \equiv V_f/I_o$ and $A_f \equiv I_o/V_s$. (15%)
 - (b) If the loop gain is large, find an approximate expression for A_f and state precisely the condition for which this applies. (10%)

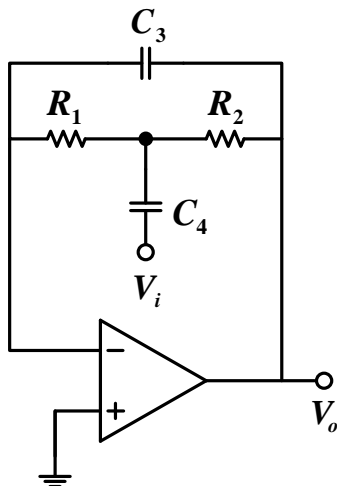


Fig. 3

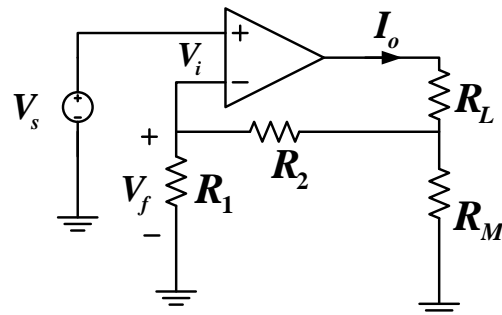


Fig. 4