

國立彰化師範大學 97 學年度碩士班招生考試試題

系所：顯示技術研究所碩士班

科目：電子學

☆☆請在答案紙上作答☆☆

共 2 頁，第 1 頁

1. An amplifier has the voltage transfer function

$$T(s) = \frac{s}{\left(1 + \frac{s}{10^2}\right)\left(1 + \frac{s}{10^6}\right)}$$

- (a) Find the poles and zeros. (3%)
- (b) Draw the Bode plot for the magnitude of the transfer function. (6%)
- (c) Draw the Bode plot for the phase of the transfer function. (6%)

2. For the circuit as shown in Figure 1.

- (a) Find the midband gain. (10%)
- (b) Find the upper 3-dB frequency. (10%)

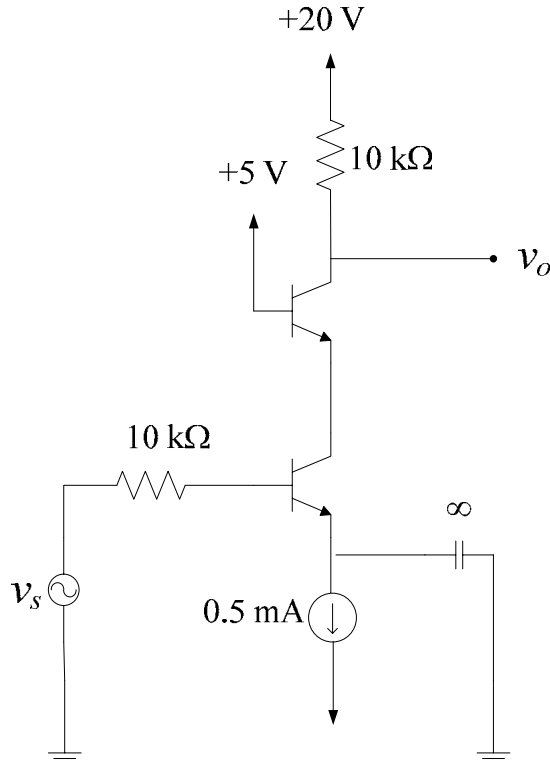


Figure 1

3. For a CMOS inverter, draw the voltage transfer characteristic and explain and identify the operation regions of PMOS and NMOS in the transfer characteristic. (15%)

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共 2 頁，第 2 頁

4. For the circuit as shown in Figure 2.
- Find the voltage gain V_o/V_s . (8%)
 - Find the input resistance R_{in} . (6%)
 - Find the output resistance R_{out} . (6%)

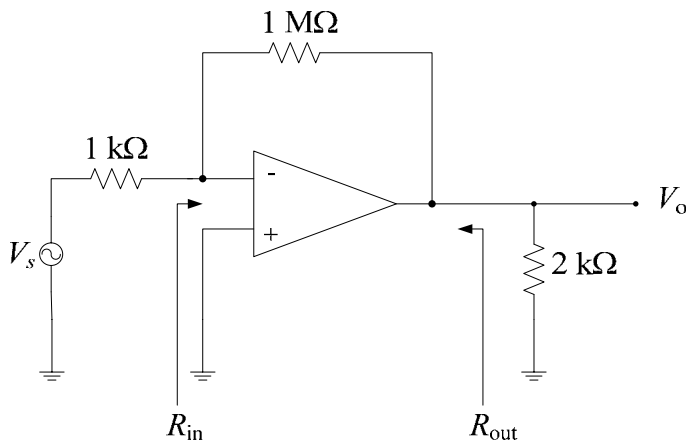


Figure 2

5. For the circuit as shown in Figure 3.
- Find the output offset voltage. (10%)
 - What does the output offset voltage become with the input ac coupled through a capacitor? (10%)

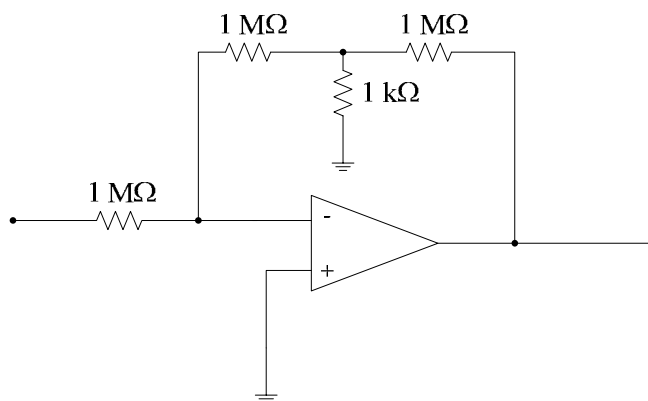


Figure 3

6. For a CMOS inverter with matched MOSFETs having threshold voltage $V_{tn} = |V_{tp}| = 1$ V, find the noise margin. (10%)