

## 淡江大學九十四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

准帶項目請打「V」

✓

簡單型計算機

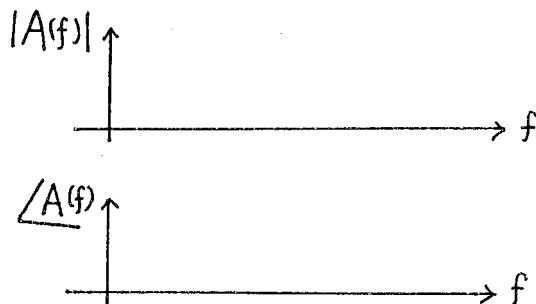
節次：7月3日第1節

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※請務必依序作答※

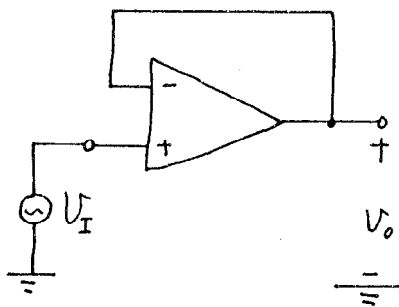
10%

1. Draw the ideal amplitude and phase responses of an ideal voltage amplifier.



15%

2. Please derive the gain expression of the voltage follower below. (Assume the OP AMP is ideal except that it has a finite gain  $A$ )



15%

3. When a load resistor of  $2\text{ k}\Omega$  is connected to a voltage amplifier, the output voltage  $V_o$  would decrease 20%. What is the value of the amplifier output resistance  $R_o$ ?

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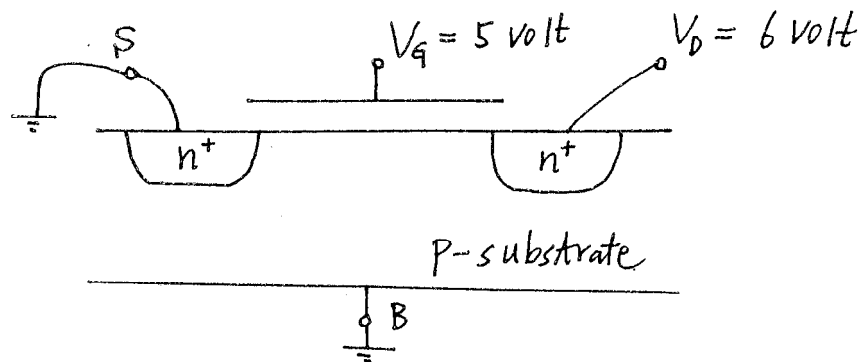
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10%

4. Draw the channel shape in the MOS figure below. (Assume the threshold voltage  $V_t = 2$  volt)



10%

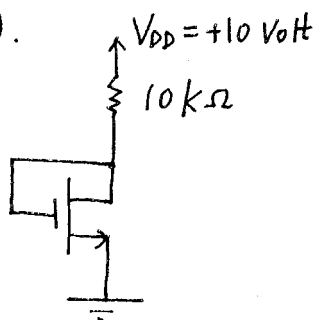
5. A transistor with  $\beta = 150$  is biased to operate at a dc collector current  $I_C = 1.5$  mA. Find the values of  $g_m$ ,  $V_{re}$  and  $V_e$ . (Assume room temperature).

10%

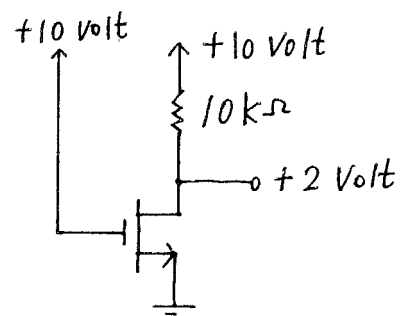
6. (a) What is the body effect in a MOS amplifier?  
(b) How to avoid it?

10%

7. In what region is the MOSFET operated in the following figures (a) and (b).



(a)



(b)

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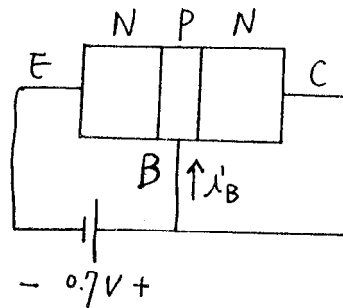
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10%

8. In the circuit below, if the basewidth  $W_B$  of the transistor is enlarged conceptually, how would the base current  $|i_B|$  change?



10%

9. For the op-AMP circuit below, when a dc voltage  $V_I = 0.01$  Volt is applied, what is the steady output voltage  $V_O$ ?

