

國立臺北大學 103 學年度學士班暨進修學士班轉學生招生考試試題

系 別：通訊工程學系、電機工程學系學士班 3 年級 考試時間：80 分鐘
 科 目：電子電路 第 1 頁 共 1 頁

□可 不可 使用計算機

1. (10%) The open loop amplifier has infinite input impedance and infinite gain, derive the transfer function $V_{out}(s)/V_{in}(s)$ of the circuit shown in Fig. 1.
2. (10%) Assume a diode has voltage drop V_{ON} when it turns on. Plot the input/output characteristic of the circuit shown in Fig. 2. (Hint: input as x-axis and output as y-axis)
3. (10%) Explain the operational principles of the devices R_C and R_E , C_1 and C_2 of the circuit shown in Fig. 3?
4. (10%) Ignoring the body effect and the short channel effect of the MOSFET, draw the low-frequency small-signal model and derive the low-frequency gain of the circuit shown in Fig. 4?
5. (10%) Derive the voltage across the resistor R_4 shown in Fig. 5.
6. (10%) Derive the current on the resistor R_3 shown in Fig. 6.
7. (10%) Capacitive reactance X_C and resistor R in parallel that is supplied by a sine wave voltage V_A . Draw the signal waveforms of V_A , branch currents I_R and I_C by showing one cycle. (Fig. 7) (Hint: You must identify 90° , 180° , 270° , and 360° in one cycle.)
8. (10%) Explain (a) channel length modulation of a MOSFET. (b) early effect of a BJT.
9. (10%) How much current is needed for a 24Ω resistor that dissipates 600 Watt?
10. (10%) Draw the Bode plot gain response of the transfer function $A(s)=10\frac{(1+(s/10^2))}{(1+(s/10^6))}$.

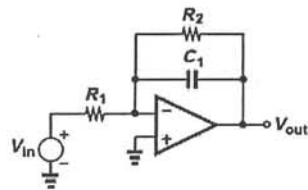


Fig. 1

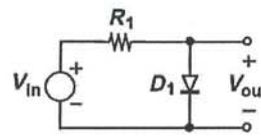


Fig. 2

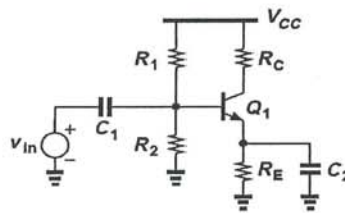


Fig. 3

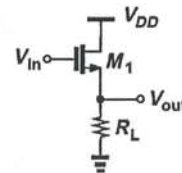


Fig. 4

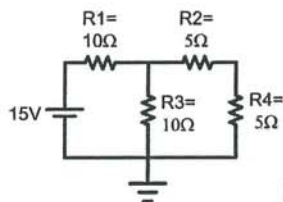


Fig. 5

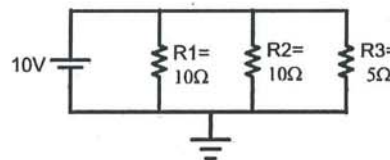


Fig. 6

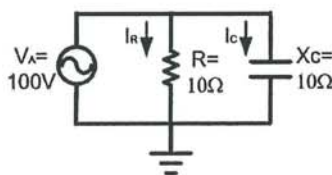


Fig. 7

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