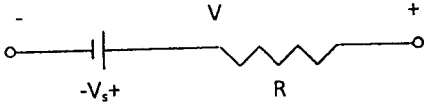


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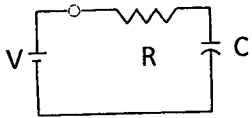
日期節次：101 年 3 月 17 日 第 3 節 13:00~14:30

科目：電子學

1. 請畫出下列問題的 I-V chart (1)理想電壓源 (Ideal Voltage Source), (2)理想電流源 (Ideal Current Source), (3)The I-V chart of the following figure. [4]

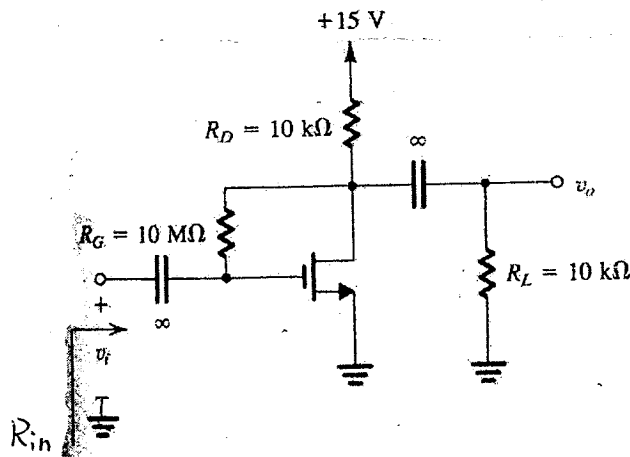


2. 請將下列的電路以 $V_c(t)$ 為主的一次方程式來表示? [4]

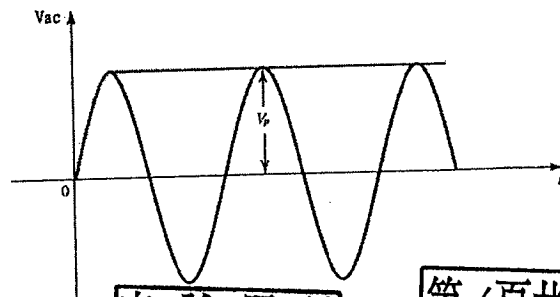
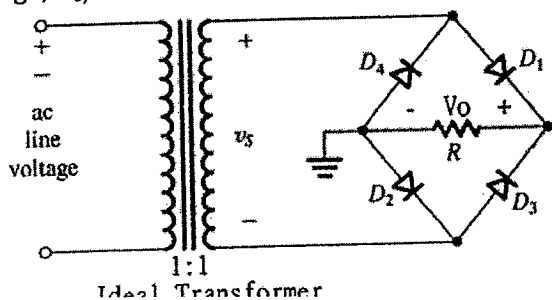


3. 電容的阻抗(impedance), 標示為 $Z_c = 1/sC$ (or $1/j\omega C$)。此阻抗是為一個虛數, 但虛數在自然界並不存在, (1)請說 Z_c 是否存在?(2) Z_c 表達的

7. Analyze the circuit shown in the following figure to determine the voltages at all nodes and the currents through all branches. Let $V_t = 1$ V, $k_n'(W/L) = 0.25$ mA/V². Neglect the channel-length modulation effect (i.e. assume $\lambda = 0$). [15]



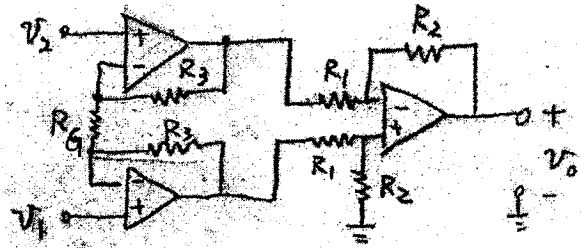
8. Give a Bridge Rectifier, shown at the left part of the following figure. A sinusoidal input voltage source, v_{ac} , is an AC voltage source with its peak equal to V_p . The waveform of v_{ac} is drawn at the right part of the given figure. It has assumed that all diodes are ideal diodes. Please plot the waveform of output voltage, V_o , with respect to input voltage source. [15]



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第 / 頁共 2 頁

- 意義為何? [4]
4. 請寫出方均根(rms)的定義 [4]
5. 請說明什麼為線性函數, 將定義明確表示。 [4]
6. Please calculate the output voltage, v_o , with respect to input v_1 and v_2 . [15]

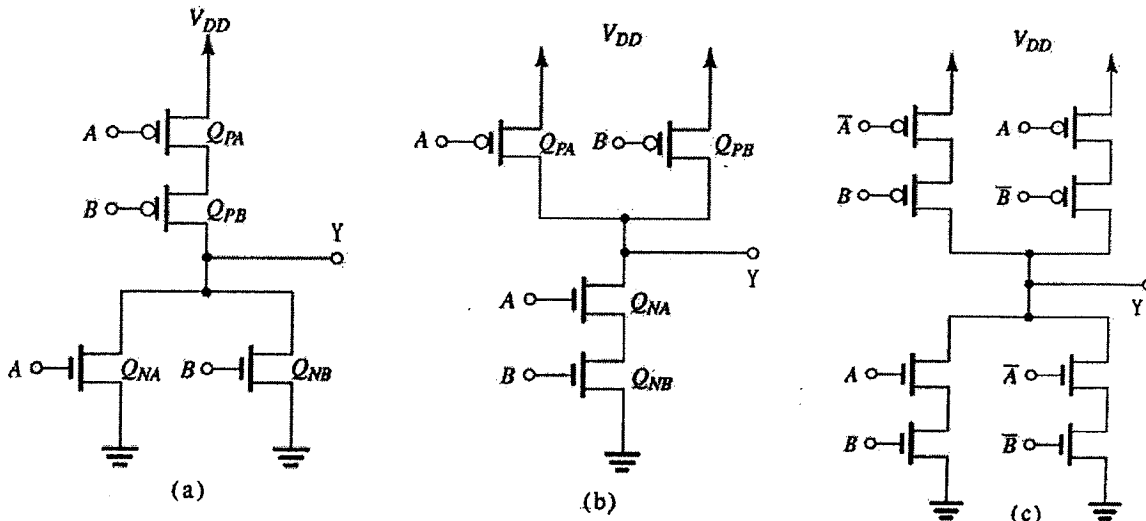


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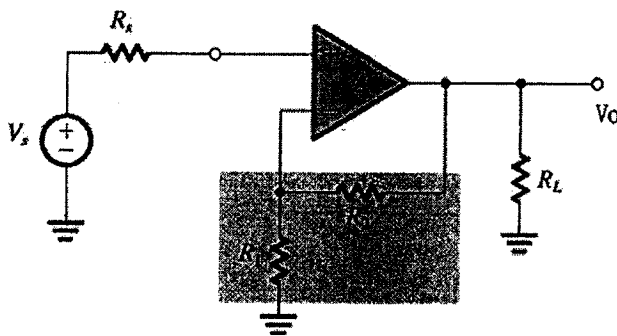
日期節次：101 年 3 月 17 日 第 3 節 13:00~14:30

科目：電子學

9. Give three CMOS circuits, shown as follows. Please write down the digital operations of output Y. [15]



10. A non-negative OP-AMP circuit with an implementation of a feedback loop is shown on the following figure. It has assumed that the OP-AMP has infinite input and zero output resistance. Please answer these questions: (a) Find out the expression of the feedback factor, β . (b) If the open-loop voltage gain of this OP-AMP is 10^4 ($A=10^4$), find out R_2/R_1 to obtain a closed-loop voltage gain A_f of 10. [20]



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第 2 頁 共 2 頁