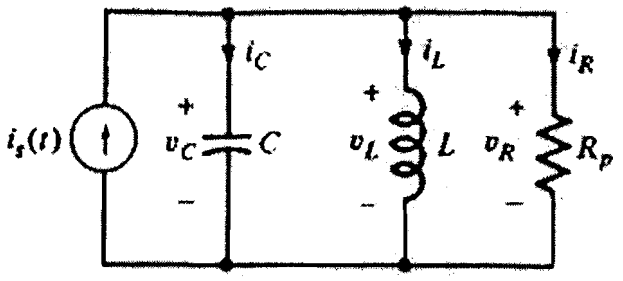
中國文化大學 100 學年度轉學招生考試

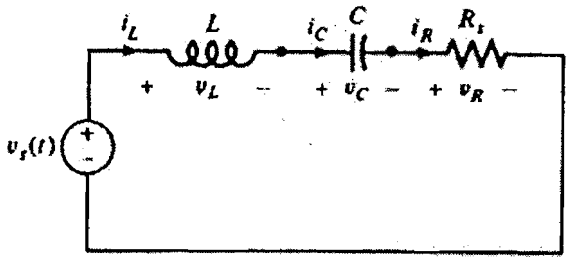
系組：電機工程學系三年級　　日期節次：7 月 27 日第 2 節 11:00-12:20

科目：**電路學**　(74-168)

1. Please describe the theorem of KCL and KVL and Ohm's Law. [10 credits]
2. Please explain the theorem of superposition of electronic circuit. [10 credits]
3. Please give the impedance of capacitor and inductor. [10 credits]
4. Give the following two linear time-invariant circuits, shown as follows. Please write down their standard forms of second-order differential equations with respect to the input source of given circuit. [10]



(a)



(b)

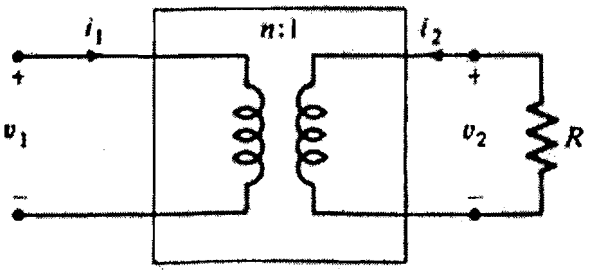
5. Give an ideal transformer, shown as follow. Please give the definition of the following: [15 credits]

   A relationship is given as

   A. $v_1/i_1 = (?)$

   B. $(v_2/i_2) = (?)R$.

   Please write down the answers of part (A) and (B).

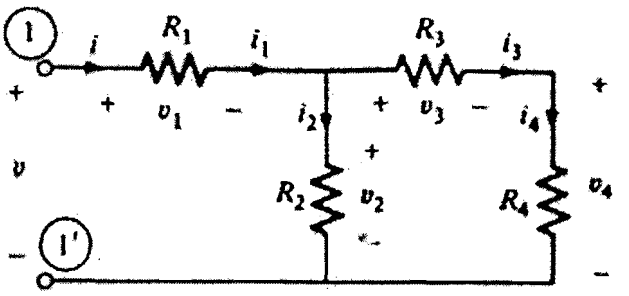


6. Give a ladder circuit shown on the following figure. The input terminal is a voltage v and output terminal is voltage v_4. There are total 4 resistors R_1, R_2, R_3, and R_4 (where $R_1=R_2=R_3=R_4 = 10\Omega$) and the input voltage v=10 (V). Please answer the following questions: [15 credits]

   a、 Please give the value of voltage, v_2 [5]

   b、 Please give the value current, i_1 [5]

   c、 The equivalent resistance R of all resistors. [5]

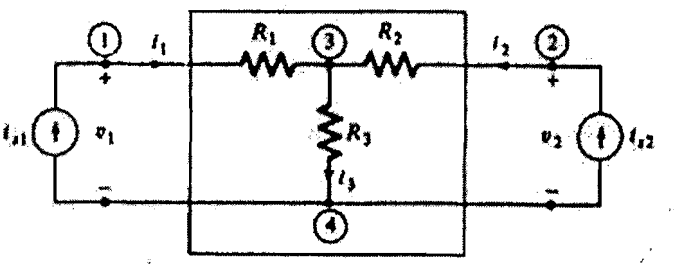


7. Give the following circuit, shown as follow. Please answer the following questions:

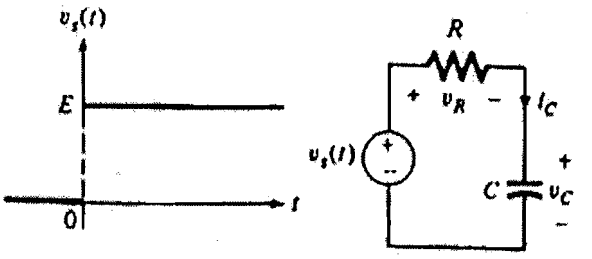
   $i_1 = (A)\, v_1 - (B)\, v_2$

   $i_2 = (C)\, v_1 + (D)\, v_2$

   , where the resistors R_1, R2, and R3 are all equal to 10Ω and the current source i_{s1} is 1 Ampere and the current soure i_{s2} is 1 Ampere. Please write down the answer of part (A), (B), (C), and (D) with respect to the given values of resistors and current sources. [15 credits]



8. Give a RC circuit, shown as follow. Please use the general conditions of capacitor: $v_c(t_0)=0$, $t_0=0$, and $v_{oc}(t) = E$, $t>=0$. Please give the voltage of $v_c(t)$ corresponding to the given circuit and general conditions of capacitor. [15 credits]



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