

大同大學 九十二 學年度 轉學考試 試題

考試科目：電路學 系別：電機工程學系

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註：本次考試不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

(-) Plot the waveform specified below.

(10%) $f(t) = 2u(-t+1.5) - 3.5u(-t-2)$, where $u(t)$ is the unit step function.

(=) Given the circuit shown in Fig.1.

(40%) (a) Write the differential equation for the current $i_L(t)$.

(b) Find the zero-input response when $i_s(t) = 0$,
initial state $i_L(0) = I_0$.

(c) Find the step response.

(d) Find the impulse response.

(e) If $i_s(t) = 2u(t)$, initial state $i_L(0) = 3I_0$, where $u(t)$ is unit step function,
find the complete response $i_L(t)$.

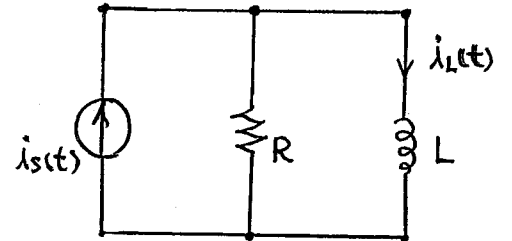


Fig. 1

(≡) Derive the expression for R_2 such that the two ports shown in Fig.2 are equivalent.

(15%)

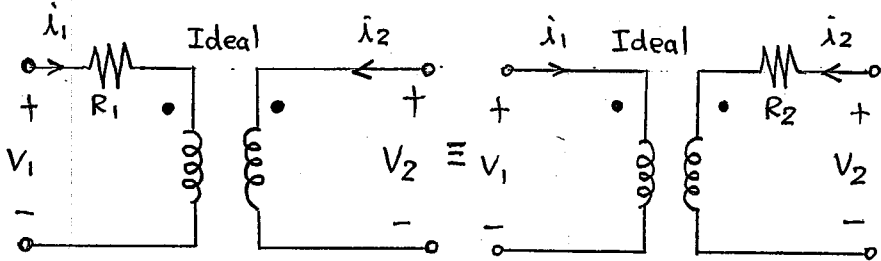


Fig. 2.

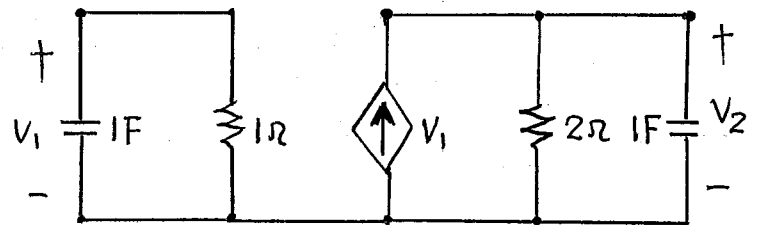


Fig. 3.

(Ⅳ) Find the natural frequencies of the network variables (V_1 and V_2) indicated on the network shown in Fig.3.

(15%)

(Ⅴ) The linear time-invariant circuit shown in Fig4. is in the steady state.

(20%)

(a) Determine the open circuit voltage $V_{oc}(t)$ at terminal $\textcircled{1}$ and $\textcircled{1}'$,
when the load is open-circuited.

(b) Determine the equivalent impedance Z_{eq} which is faced by the load.

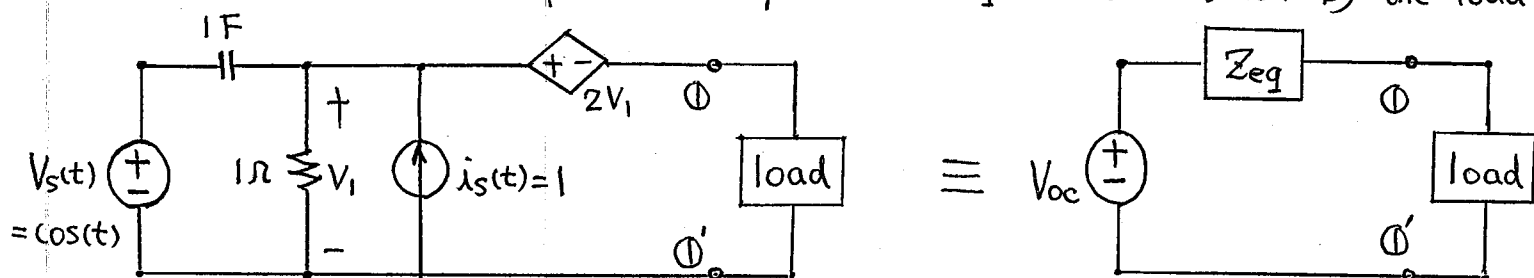


Fig. 4.