

國立臺北科技大學 100 學年度碩士班招生考試

系所組別：2120 電機工程系碩士班乙組

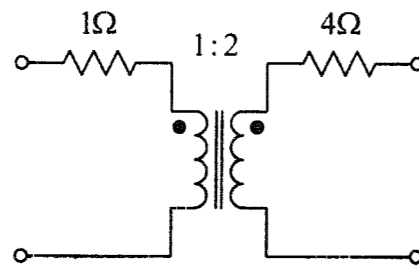
第一節 電路學 試題

第一頁 共二頁

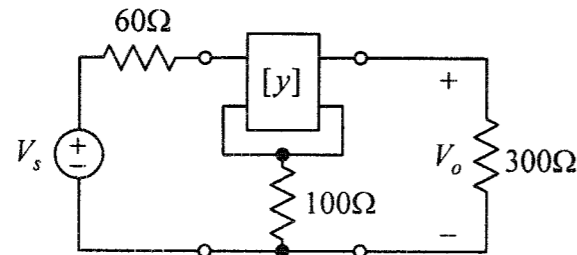
注意事項：

1. 本試題共 10 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. Determine the h parameters in the following circuit. (10%)



2. In the following circuit, let $y_{12} = y_{21} = 0$, $y_{11} = 2\text{mS}$, $y_{22} = 10\text{mS}$. Find V_o/V_s . (10%)



3. For the linear system to be considered, when the input voltage is $V_i(s) = 2\text{ V}$ and

$$V_o(s) = \frac{2s+14}{s^2+6s+8} \text{ V. Please find the output voltage } v_o(t) \text{ when the input voltage is}$$

$$v_i(t) = 4e^{-t}u(t) \text{ V. (10\%)}$$

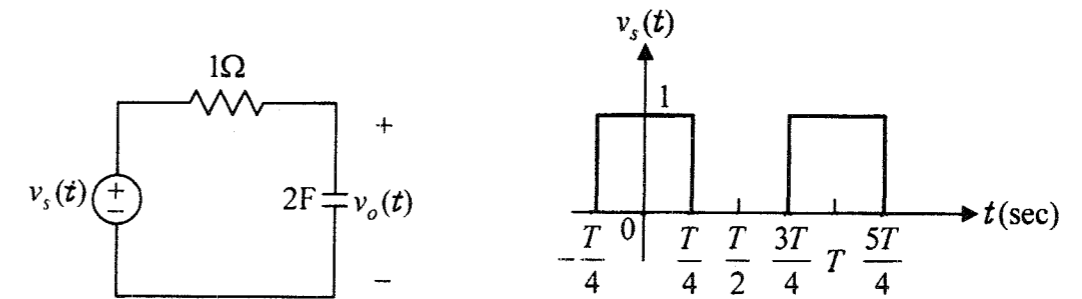
4. The voltage and the current at the terminals of a circuit are

$$v(t) = 2 + \cos \pi t + \sin \pi t + \cos 3\pi t \text{ V}$$

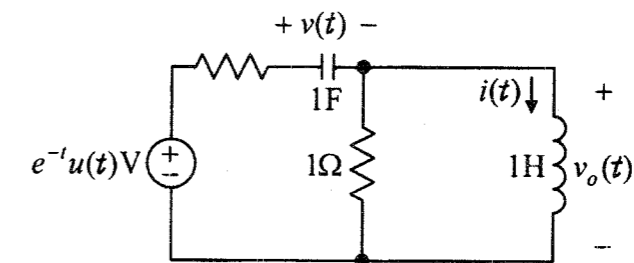
$$i(t) = 1 + \sin \pi t + \cos(3\pi t - 60^\circ) \text{ A}$$

Find the average power absorbed by the circuit. (10%)

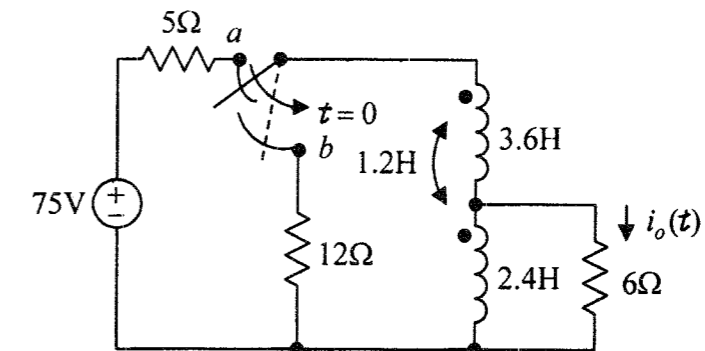
5. Find the steady-state response, $v_o(t)$, of the following RC circuit. The input voltage $v_s(t)$ is the square wave shown in the following figure with $T = \pi$ seconds. In this case, we will represent this square wave by the first four terms of its Fourier series. (10%)



6. Find $v_o(t)$ in the following circuit if $v(0) = 2\text{ V}$ and $i(0) = 1\text{ A}$. (10%)



7. The make-before-break switch in the following circuit has been in position 'a' for a long time. At $t = 0$, it moves instantaneously to 'b'. Find $i_o(t)$ for $t \geq 0$. (10%)



8. A professional center is supplied by a balanced three-phase source. The center has four balanced three-phase loads as follows:

Load 1: 150kVA at 0.8pf leading

Load 2: 100kW at unity pf

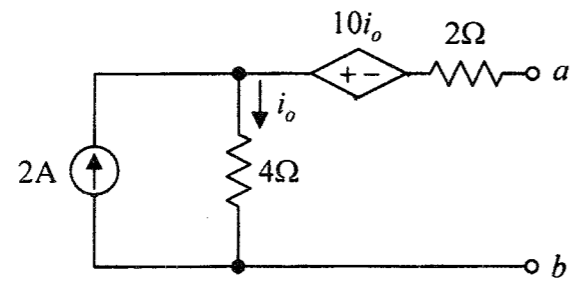
Load 3: 200kVA at 0.6pf lagging

Load 4: 80kW at 95kVAR (inductive)

If the line impedance is $0.02 + j0.05 \Omega$ per phase and the line voltage at the loads is 480V, find the magnitude of the line voltage at the source. (10%)

注意：背面尚有試題

9. Determine the Norton equivalent at terminals $a-b$ in the following circuit. (10%)



10. For the following circuit to be considered, find I_1 using mesh analysis. (10%)

