

國立臺北科技大學 102 學年度碩士班招生考試

系所組別：1523 自動化科技研究所乙組

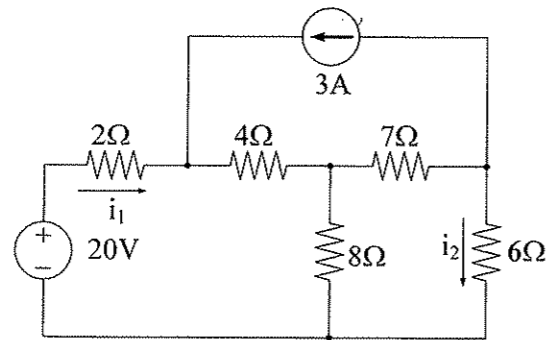
第二節 電路學 試題 (選考)

第一頁 共二頁

注意事項：

1. 本試題共 6 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。

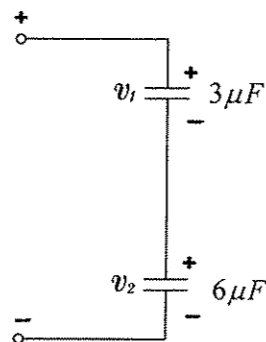
1. For the circuit shown below, find i_1 and i_2 . (20%)



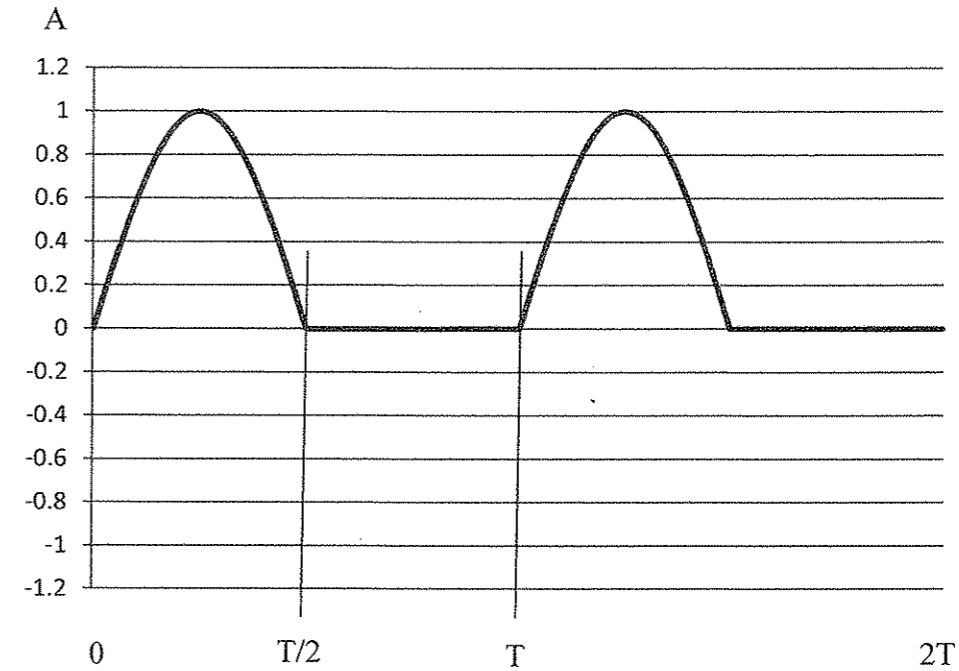
2. For the circuit shown below, a $3\text{-}\mu\text{F}$ capacitor and a $6\text{-}\mu\text{F}$ capacitor are in series, with the following conditions before a DC 30V voltage source is connected at $t=0^-$:

$$v_1(0^-) = 10\text{V}, v_2(0^-) = -10\text{V}$$

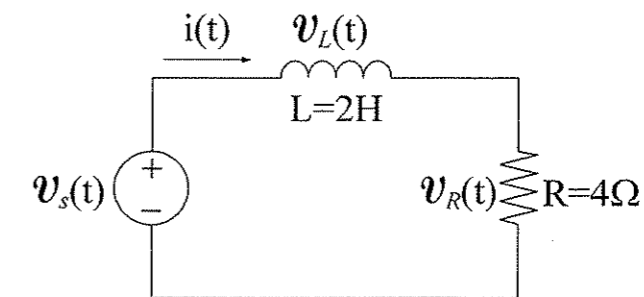
A DC voltage source of 30V is connected at $t=0$. Calculate the voltages, V_1 and V_2 , across the two capacitors. (20%)



3. The diagram shown below plots a half-rectified current $i(t)$ found in some electronic circuits. This waveform consists of a sine wave with the negative excursions removed, so $i(t) = \sin \omega t$ for $0 \leq t \leq T/2$; and $i(t) = 0$ for $T/2 < t < T$, and so forth. Determine the corresponding RMS value. (12%)

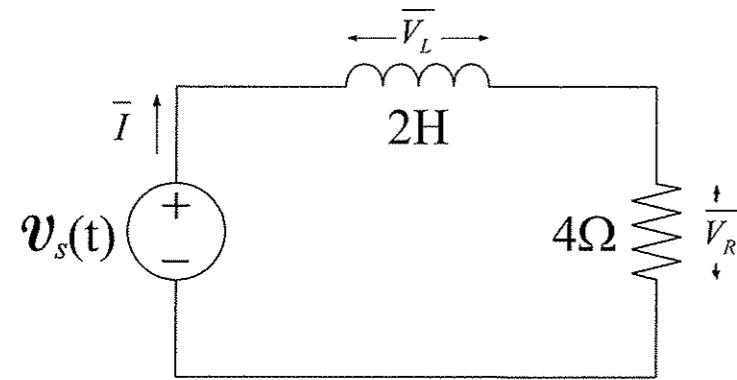


4. The unit impulse and unit step responses of the circuit shown below are $h(t) = (A_1 + A_2 \times e^{A_3})u(t)$ and $s(t) = (B_1 + B_2 \times e^{B_3})u(t)$ respectively. Find the values of A_1, A_2, A_3 and B_1, B_2, B_3 . (18%)



注意：背面尚有試題

5. For the circuit shown below, the voltage source is $v_s(t) = 4\sqrt{2}\cos(2t + 45^\circ)V$. Find the **phasor** current of \bar{I} and the **phasor** voltages, \bar{V}_L and \bar{V}_R , across the inductor and resistor. (15%)



6. A two-terminal passive load draws an apparent power of 10kVA at a power factor of 0.5 lagging from a 100-Vrms line whose frequency is 100 rad/s. Find the average power absorbed of the circuit. (15%)