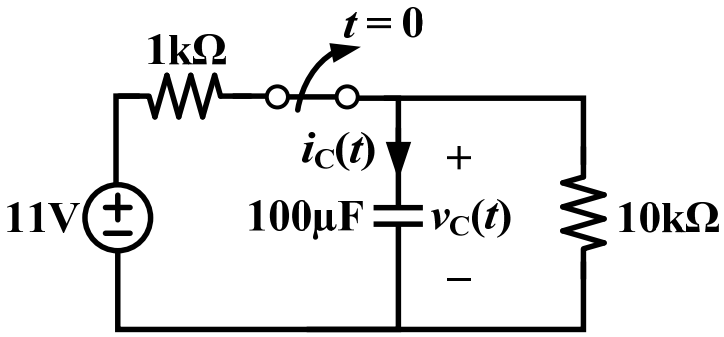
電路學(EE2210)第六次隨堂考

2015年4月29日
時間：10 分鐘
Close Book

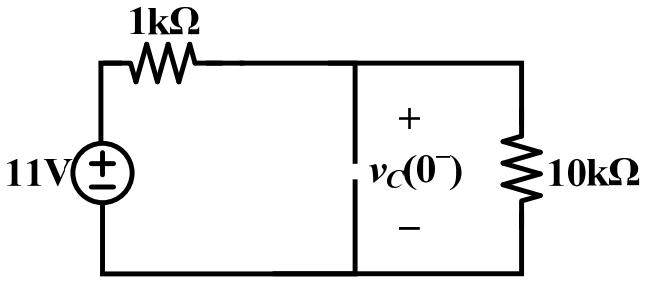
學號：_____

姓名：_____

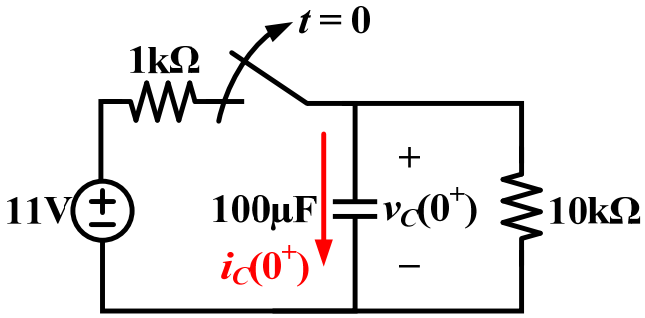
For the circuit as shown in the following figure, the switch has been closed for a long time before it is opened at $t = 0$. Find $v_C(0^+)$ and $i_C(0^+)$, i.e. right after the switch is opened.



Solutions:
Because the switch has been closed for a long time before $t = 0$, the capacitor can be regarded as open circuit, as shown as the following circuit.



After the switch is opened at $t = 0$, the circuit become



Since the voltage across the capacitor must be the same as the switch is opened, i.e. $v_C(0^+) = v_C(0^-)$, thus $v_C(0^+)$ and $i_C(0^+)$ can be found from the above two circuits.

$$v_C(0^+) = v_C(0^-) = 11 \times \frac{10\text{k}}{1\text{k} + 10\text{k}} = 10\text{V}$$

$$i_C(0^+) = -\frac{v_C(0^+)}{10\text{k}\Omega} = -1\text{mA}$$

$v_C(0^+)$ = 10V, $i_C(0^+)$ = -1mA.