Electric Circuits (I) (Final Exam)

Department of Electrical Engineering, National Cheng Kung University

Date: Jan. 17, 2018

1. Refer to **Fig.1**. Express $i(t)$ in terms of singularity functions. (14pts)

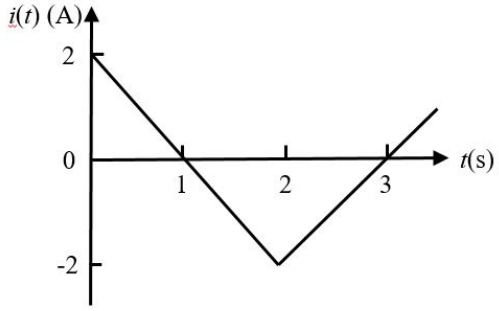

Fig.1

2. Determine $v(t)$ for $t > 0$ in the circuit of **Fig.2** if $v(0) = 0$. (14pts)

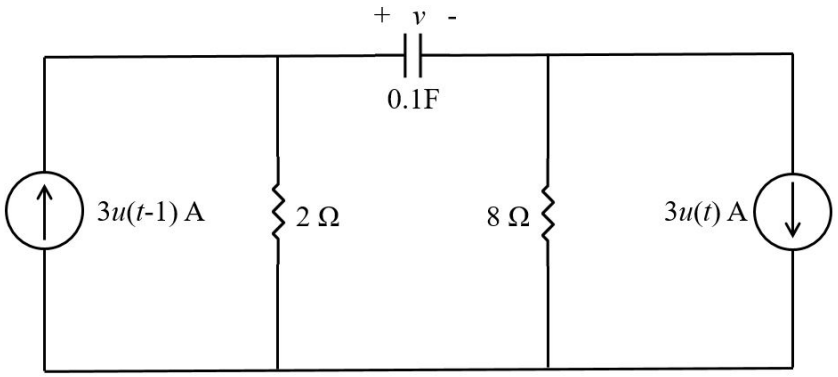

Fig.2

3. The switch in the circuit shown in **Fig.3** has been closed for a long time before it is opened at $t = 0$. Find (a) $i_L(t)$ for $t \geq 0$,(b) $i_o(t)$ for $t \geq 0^+$,(c) $v_o(t)$ for $t \geq 0^+$,(d) the power dissipated in the 10Ω resistor. (18pts)

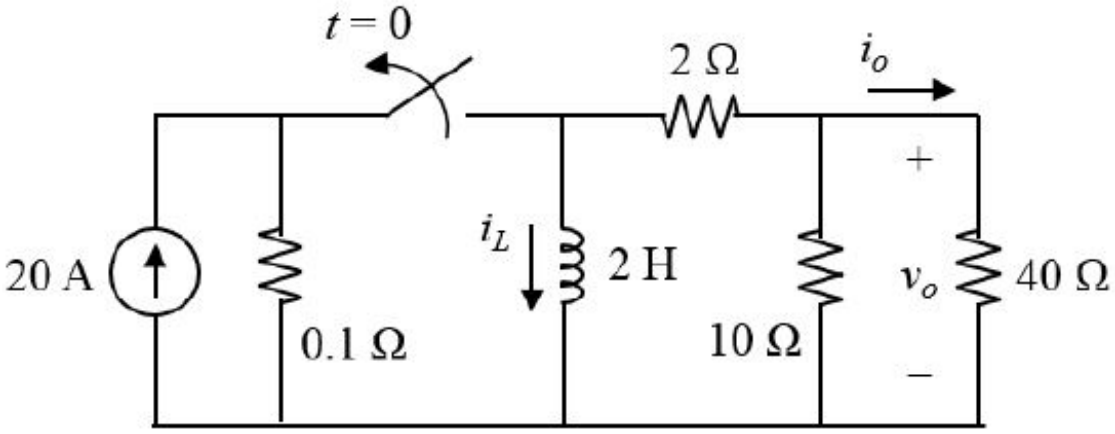

Fig.3

4. No energy is stored in the 0.1H inductor or the 0.4 μF capacitor when the switch in the circuit shown in **Fig. 4** is closed. Find $v_C(t)$ for $t \geq 0$. (18pts)

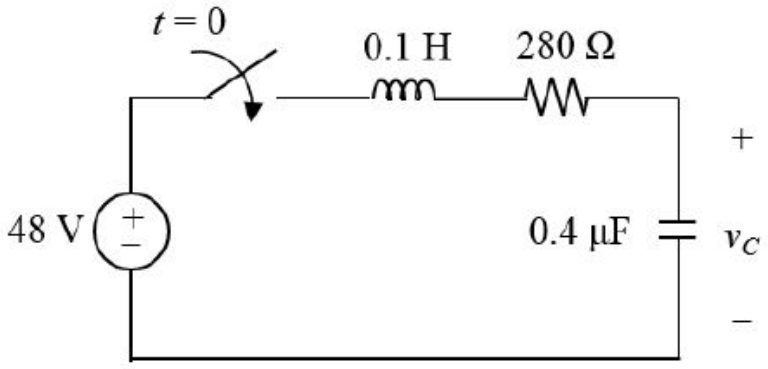

Fig.4

5. Assuming that the switch in **Fig. 5** has been in position A for a long time and is moved to position *B* at $t = 0$. Find $v(t)$ for all $t \geq 0$. (18pts)

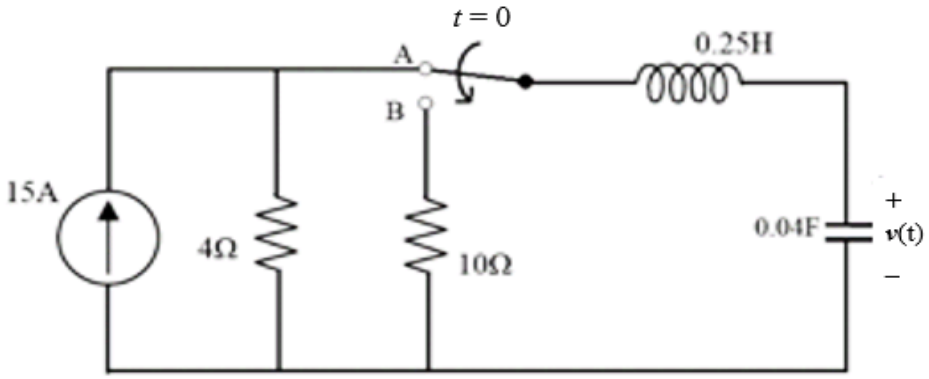

Fig.5

6. In the op amp circuit of **Fig.6**, determine $v_o(t)$ for $t > 0$. Let $v_s(t) = u(t)$. (18pts)

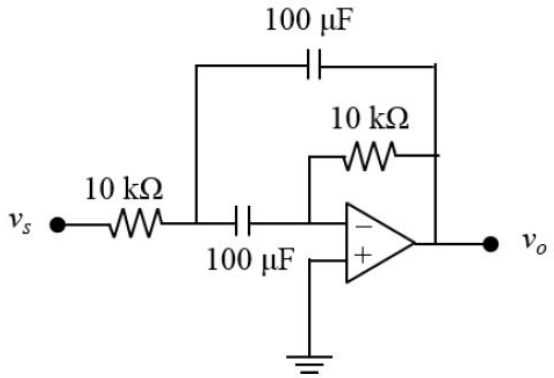

Fig.6