Student Name: _____ Student Number: _____

EE 111 Electric Circuits Midterm-Fall 2021

Nov 11 2021, 8:15 AM – 9:55 AM

6 problems in total (1 A4 crib sheet allowed)

Answer the Questions in English and on Answer Sheets only

Copy and Re-draw the circuits on Answer Sheets for all problems

Two-decimal policy applies for the final answer

1. **(16 points)** For the circuit shown in Fig.1, use mesh-current method to find i_b.

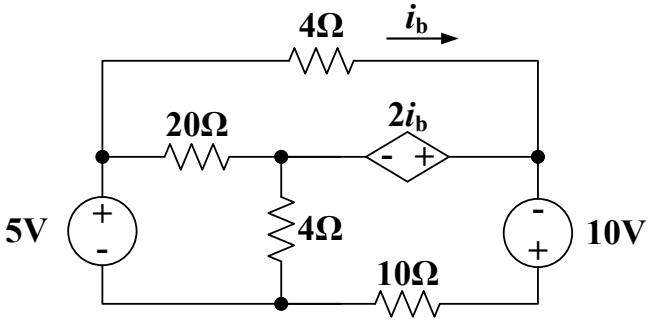

Fig. 1

2. **(16 points)** The **variable dc current source** i_{dc} in Fig.2 can be adjusted. Find the value of i_{dc} so that the power absorbed by the 4A current source is zero. *(Hint: determine if there is any current through the 40-Ω resistor, and then you may use nodal analysis method)*

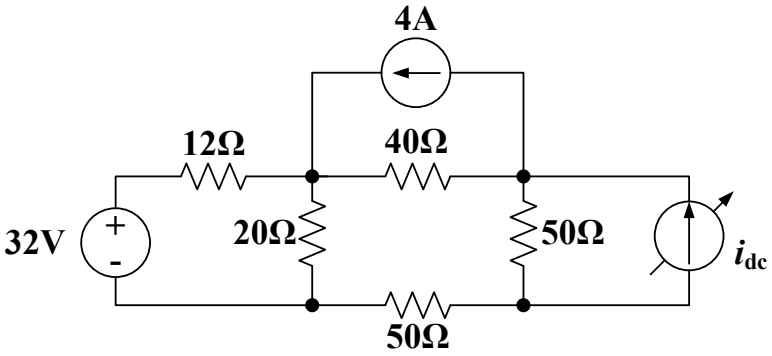

Fig. 2

3. **(16 points)** Find the **Thevenin equivalent OR Norton equivalent** with respect to the terminal a and b for the circuit in Fig.3.

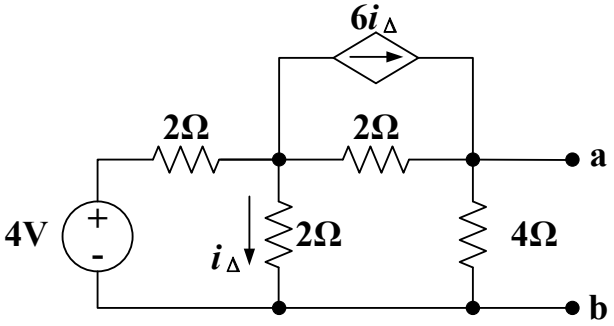

Fig. 3

4. **(16 points)** There is no energy stored in the capacitor when Switch 1 closes at $t = 0$. Twenty milliseconds (20ms) later, Switch 2 is closed, as shown in Fig.4. Find $v_o(t)$ for $t > 0$ *and sketch it in one graph.*

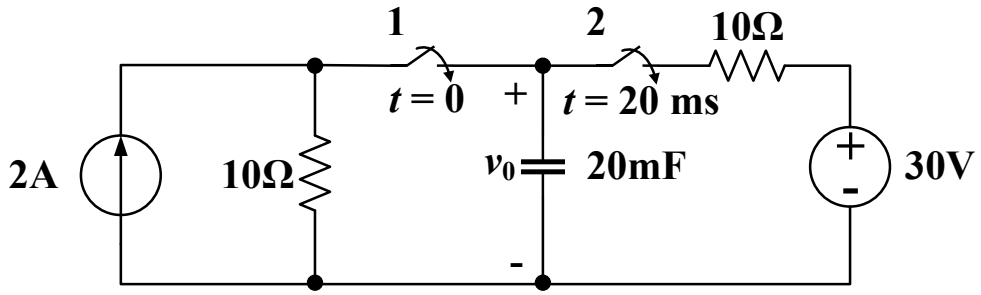

Fig. 4

5. **(16 points)** For the circuit in Fig.5, *u(t)* means unit step function. Calculate
(a) $i_L(0^+)$, $di_L(0^+)/dt$
(b) Find the 2nd-order equation to describe $i_L(t)$ *for* $t>0$ ***(No need to solve it)***

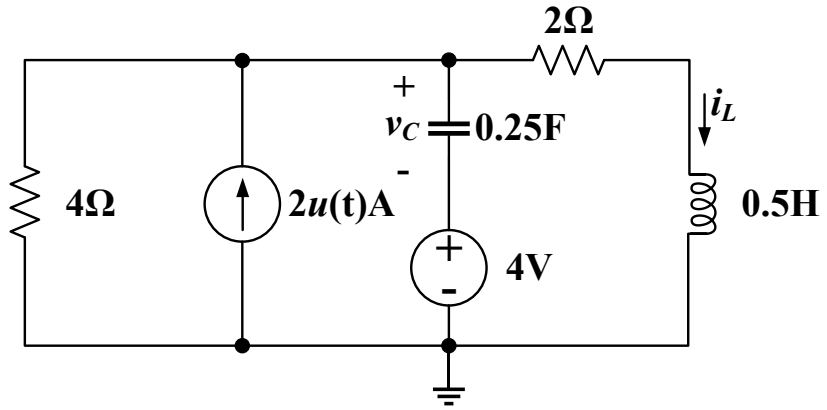

Fig. 5

6. For the circuit in Fig.6, *u(t)* means unit step function. Calculate
(15 points) (a) $i_L(t)$ *for* $t>0$
(5 points) (b) $v_c(t)$ *for* $t>0$

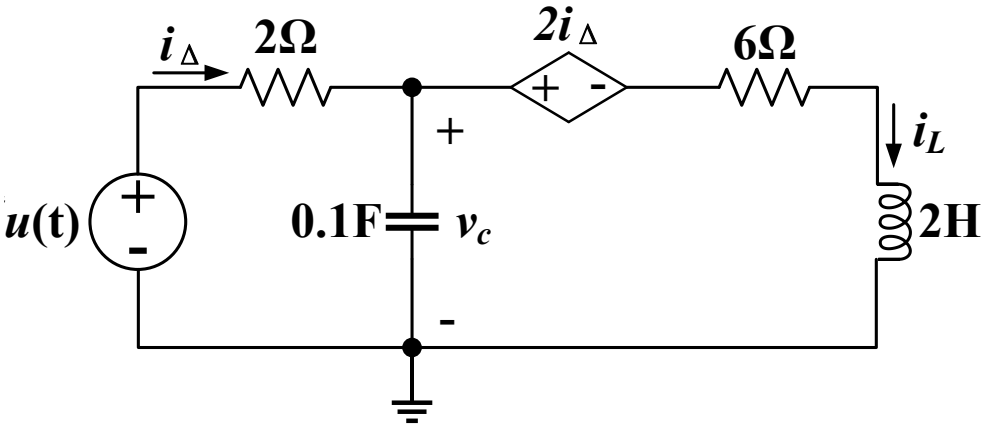

Fig. 6