CET141 | Summer 2019
RC/RL circuits in time domain analysis

Agendas and Objects:

- Introducing Inductors and capacitors in circuits
- RL/RC circuits analysis in time domain

Student Details:

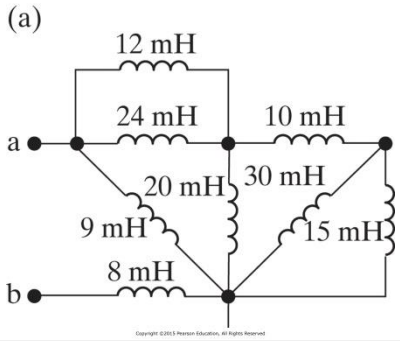
Name:

Digipen
Email:

Participation Test in this topic starts from here

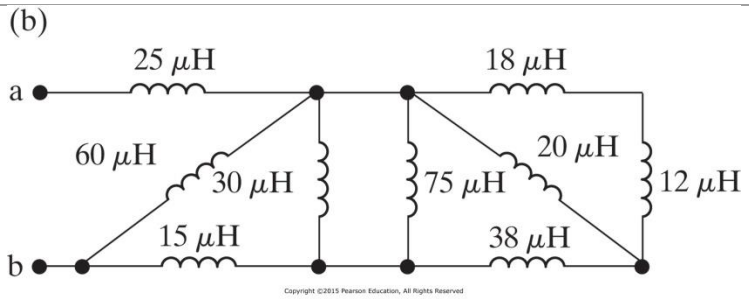
1. (10pt = 5pt each) Assume that the initial energy stored in the inductors (a) and (b) is zero. Find the equivalent inductance with respect to the terminals a, b.

(a)



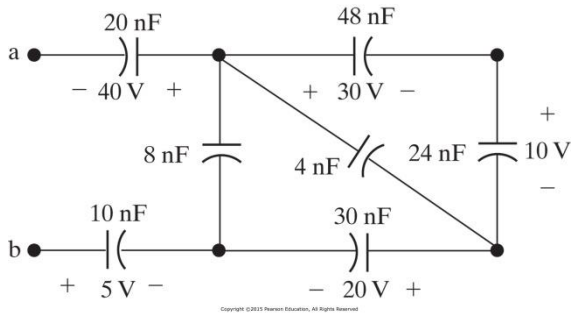
Answer:	

(b)



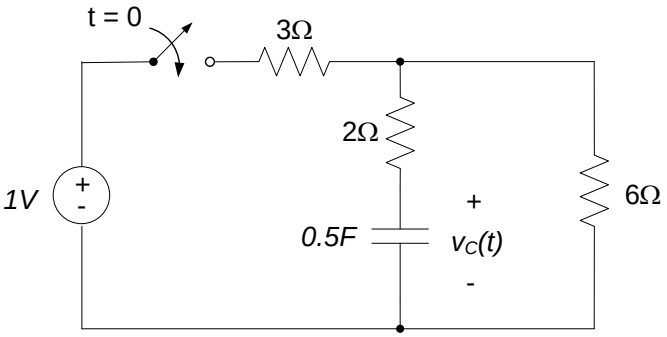
Answer:	

2. (5 pt) Find the equivalent capacitance with respect to the terminals a, b.



Answer:

3. (20 pt) The For the circuit below, determine



a) *(10 pt) $v_C(t)$, t>0*

Answer:

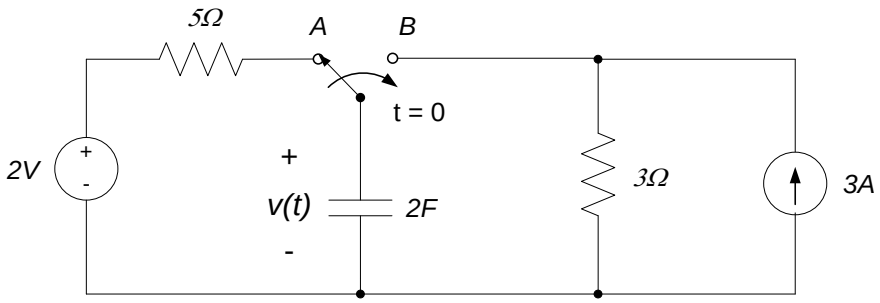
b) *(5 pt)* $v_C(t)$, *t>0* if the capacitance is *1F*

Answer:

c) *(5 pt)* $v_C(t)$, *t>0* if the capacitance is *0.25F*

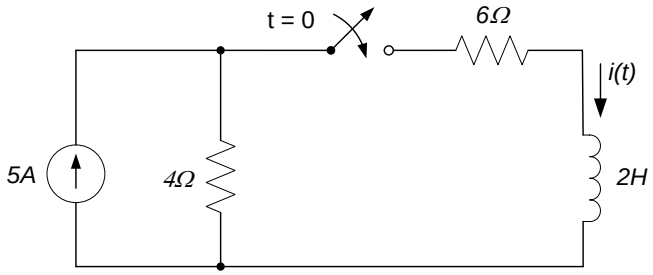
Answer:

4. (15 pt) For the circuit shown, the switch moves from position A to position B at time t = 0. Find *v(t), t>0.*



Answer:

5. (15pt = 5pt each) For the circuit shown, the switch closes at time *t = 0*.



a) Write the differential equation governing *i(t), t>0*.

Answer:	

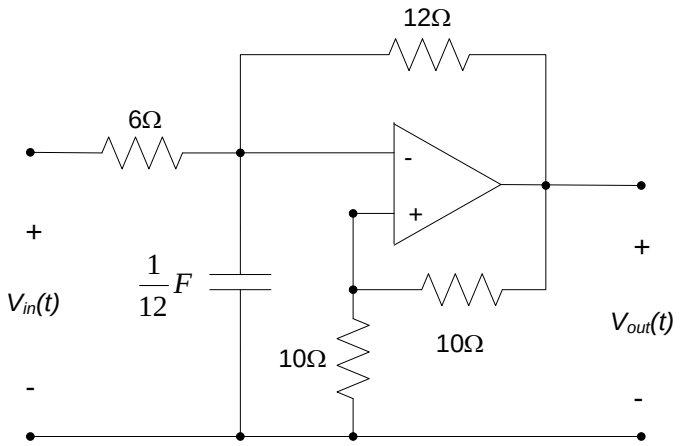
b) Determine initial (*t = 0*) and final ($t \to \infty$) conditions on the current *i(t)*. You may assume that no energy is stored in the inductor before *t=0*.

Answer:	

c) Find *i(t), t>0*.

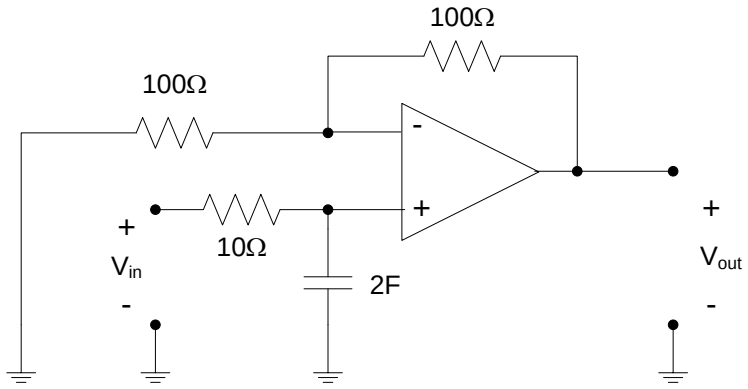
Answer:	

6. (10 pt) For the circuit below, determine the differential equation relating $V_{out}(t)$ and $V_{in}(t)$.



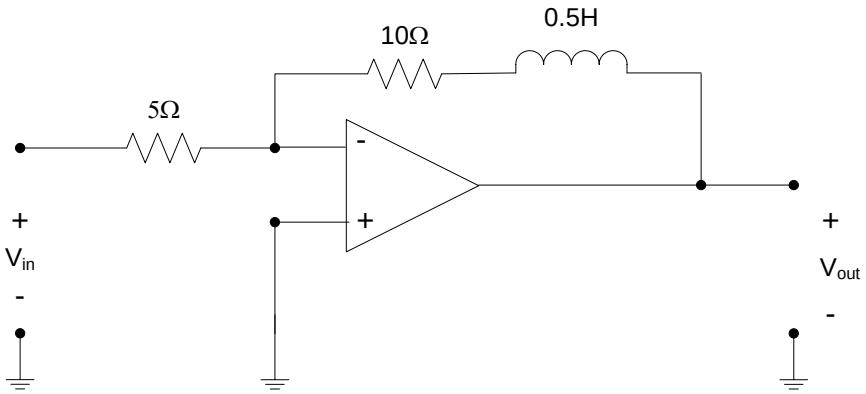
Answer:

7. (10 pt) Determine the differential equations relating V_{out} and V_{in} for the circuit below.



Answer:

8. (15 pt) Determine the differential equations relating Vout and Vin for the circuit below.



Answer:

Total Score	/100