ECE 209 — Exam # 2

Estimated time for completion: <1.25 hour
31 October 2019

Rules of the Exam

Rule 1: The examination begins at 9:30am on Thursday, 31 October 2019, and ends at 10:45am on Thursday, 31 October 2019.

Rule 2: There are four problems and a bonus problem.

Rule 3: The exam is closed book and closed notes. You may use an 8.5 x 11 inch sheet of paper with notes, and a calculator.
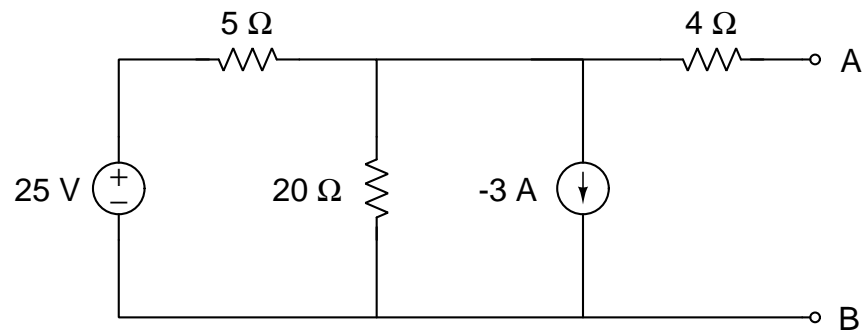
Rule 4: Do not leave the room until you have completed the exam.

Rule 5: To receive full credit for an answer, include the units along with the numerical answer.
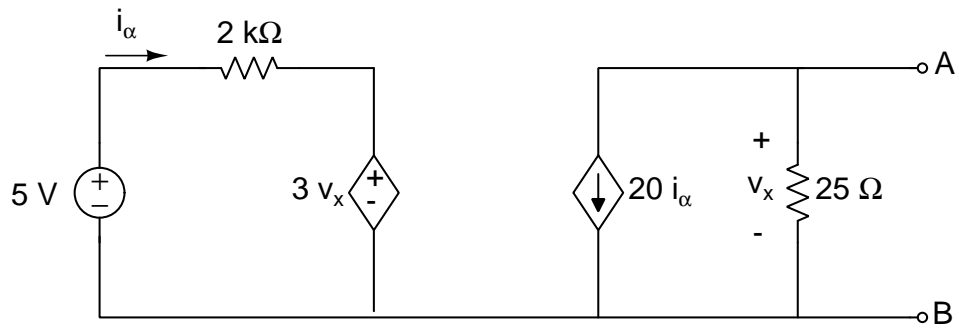
**Rule 6**: <u>Show all work</u> - answers without supporting work will not receive credit.
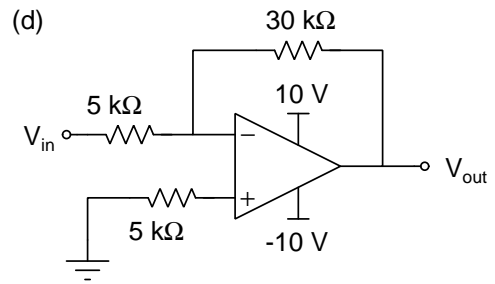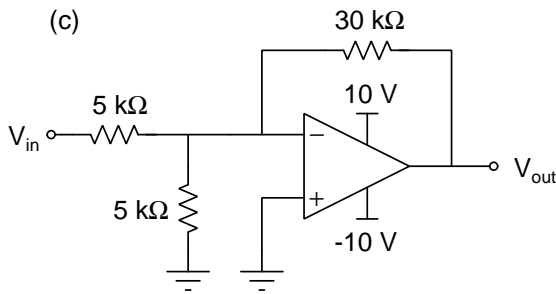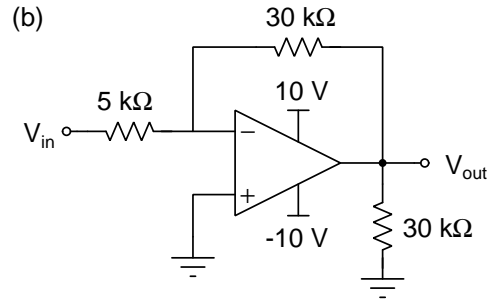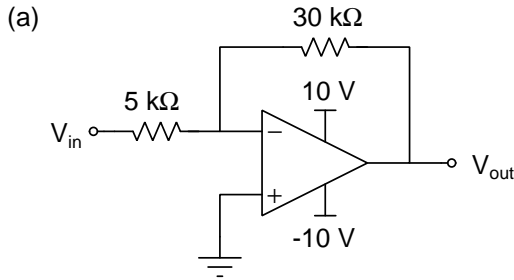

Name

Problem 1 (20 points). Draw the Thévenin equivalent circuit with respect to terminals A and B?

Problem 2 (20 points). Draw the Thévenin equivalent circuit with respect to terminals A and B?
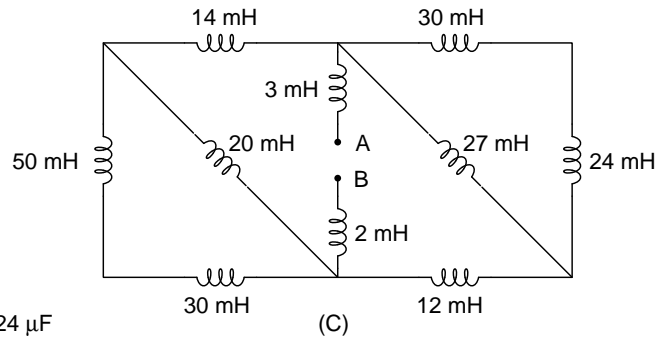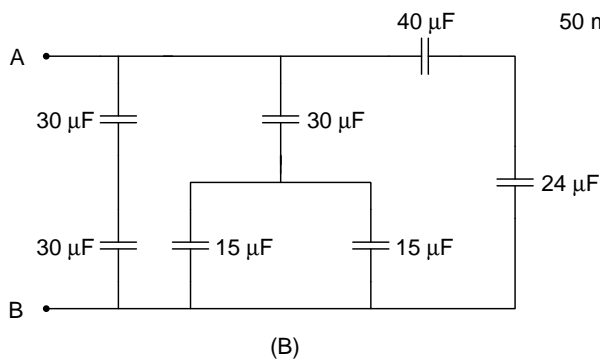
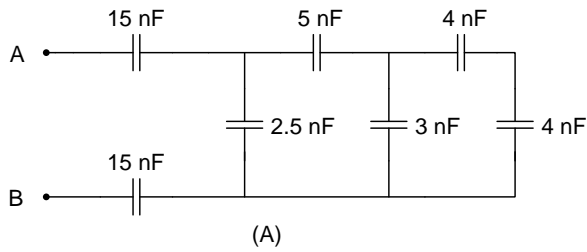**Problem 3** (30 points). The op amps below are ideal. Calculate the output voltage, V_{out}, when the input voltage $V_{in} = 1$ V.

(a)

(b)

(c)

(d)

(e)

(f)
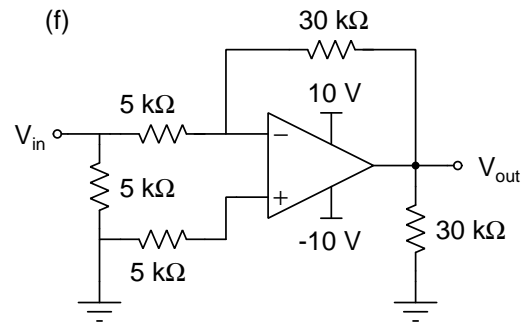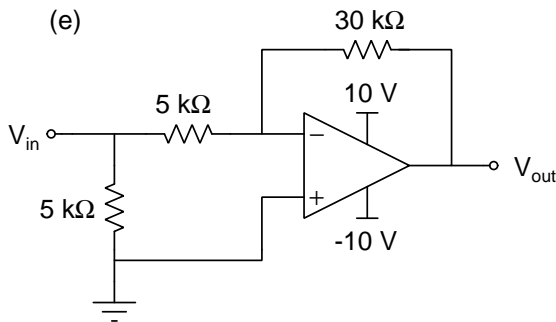
OpAmp	V_{out}	OpAmp	V_{out}
(a)		(b)	
(c)		(d)	
(e)		(f)	

Problem 4 (30 points). Consider the combinations of capacitors and inductors shown below:
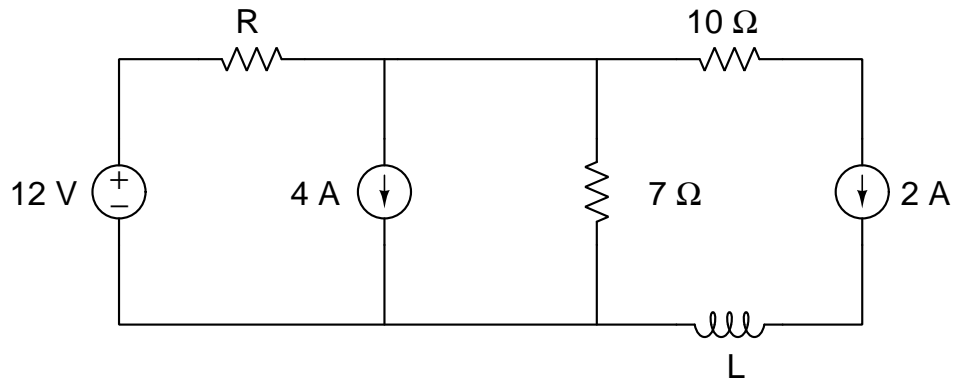

(A)

(B)

(C)

For circuits (A) and (B), calculate C_{ab}, the equivalent capacitance between terminals A and B; for circuit (C), calculate L_{ab}, the equivalent inductance between terminals A and B:

C_{ab} for circuit (A): _____

C_{ab} for circuit (B): _____

L_{ab} for circuit (C): _____

Bonus Problem (6 points). In the circuit below, the 4A source delivers no power and absorbs no power. There is 10 mJ of energy stored in the inductor. Determine the values of R and L.

R = _____

L = _____

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