

## ECE 209 — Exam # 2

Estimated time for completion: <1.25 hour  
24 October 2017

### Rules of the Exam

**Rule 1:** The examination period begins at 9:30am on Tuesday 24 October 2017 and ends at 10:45pm on Tuesday 24 October 2017.

**Rule 2:** There are four problems.

**Rule 3:** The exam is closed book and closed notes. You may have an 8.5" x 11" 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.

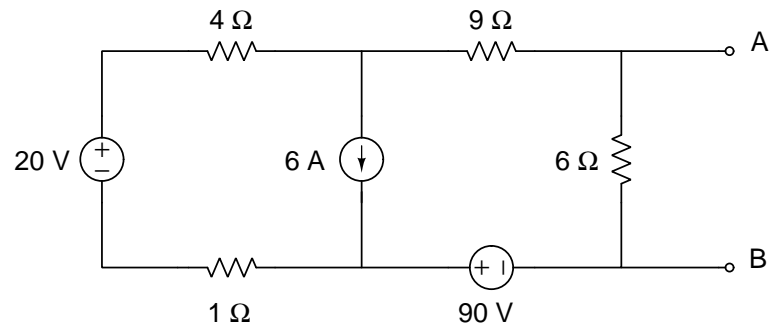
**Rule 6:** Show all work - answers without supporting work will not receive credit.

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Name

**Problem 1** (30 points)

Consider the circuit below:



**Part A:** Draw the Thévenin Equivalent Circuit with respect to terminals A and B.

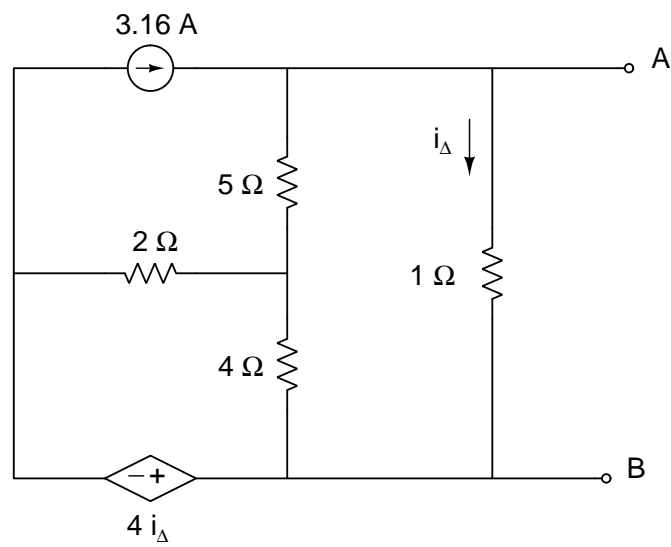
**Part B:** If a load resistor  $R_L$  is placed between terminals A and B:

What value of  $R_L$  produces maximum power transfer to the load? \_\_\_\_\_

What is the maximum power dissipated by  $R_L$ ? \_\_\_\_\_

**Problem 2** (20 points)

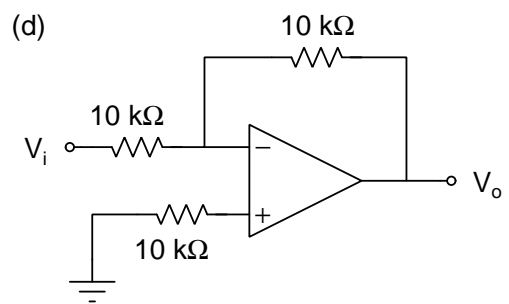
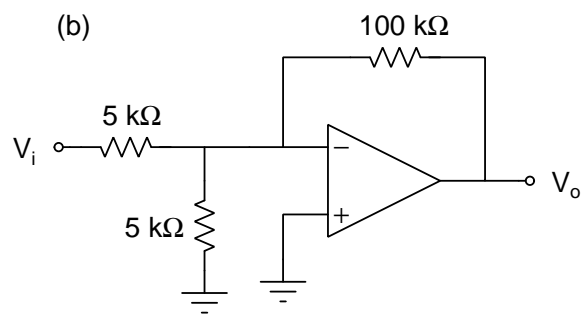
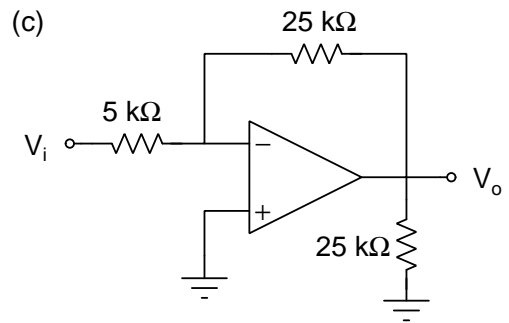
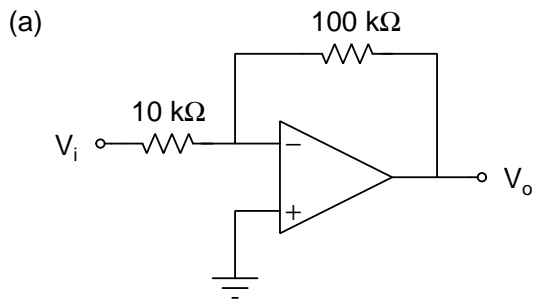
Consider the circuit below:



Draw the Thévenin Equivalent Circuit with respect to terminals A and B.

**Problem 3** (20 points)

The OpAmp in the circuits below is ideal. For each of the circuits, find the voltage gain,  $V_o / V_i$ .



Circuit (a) Voltage Gain = \_\_\_\_\_

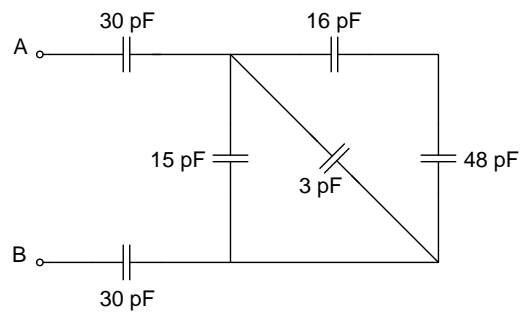
Circuit (b) Voltage Gain = \_\_\_\_\_

Circuit (c) Voltage Gain = \_\_\_\_\_

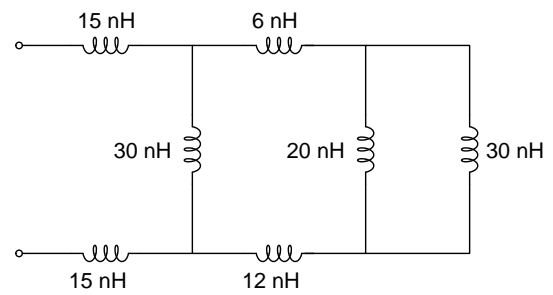
Circuit (d) Voltage Gain = \_\_\_\_\_

**Problem 4** (30 points)

Consider the circuits below:



Circuit A



Circuit B

**Circuit A:** What is the equivalent capacitance between terminals A and B? \_\_\_\_\_

**Circuit B:** What is the equivalent inductance between terminals A and B? \_\_\_\_\_

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