

# ECE 4435A Op Amp Design Quiz 1

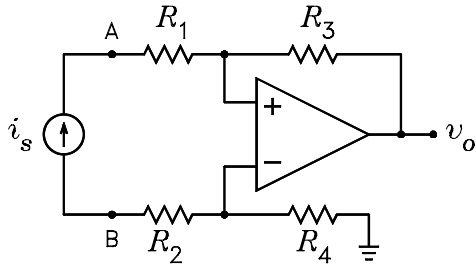
September 18, 2002

Professor Leach

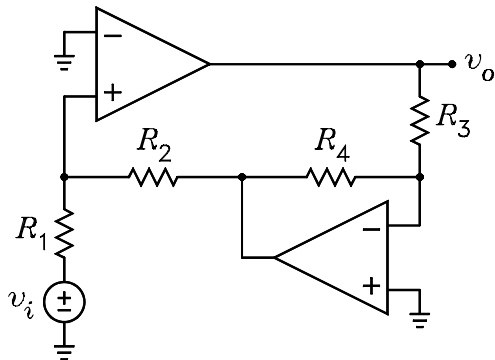
Name \_\_\_\_\_

**Instructions.** Print your name in the space above. Place a box around your answers. Express each numerical answer as a decimal number. **Honor Code Statement:** *I have neither given nor received help on this quiz.* Initials: \_\_\_\_\_

1. It is given that  $i_s = 2 \text{ mA}$ ,  $R_1 = 5 \text{ k}\Omega$ ,  $R_2 = 10 \text{ k}\Omega$ ,  $R_3 = 3 \text{ k}\Omega$ , and  $R_4 = 2 \text{ k}\Omega$ .
  - (a) Solve for  $v_A$ ,  $v_B$ , and  $v_o$ .
  - (b) Repeat part (a) with a  $4 \text{ k}\Omega$  resistor connected between A and B.

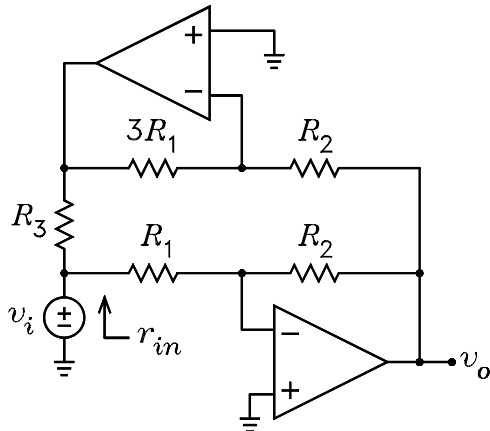


2. Solve for  $v_o/v_i$ .



3. For the circuit below

- (a) Solve for the expression for  $r_{in}$ .
- (b) If  $R_1 = 10 \text{ k}\Omega$ , solve for  $R_2$  and  $R_3$  such that  $v_o/v_i = -15$  and  $r_{in} = \infty$ .



## ECE 4435A Op Amp Design Quiz 2

November 4, 2002

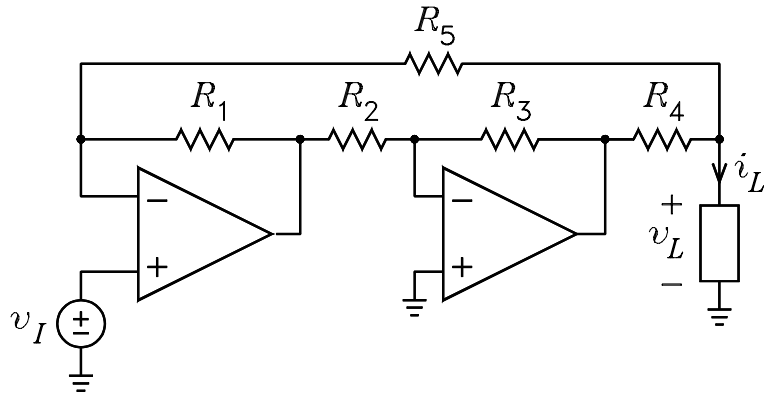
Professor Leach

Name \_\_\_\_\_

**Instructions.** Print your name in the space above. Place a box around your answers. Express each numerical answer as a decimal number. **Honor Code Statement:** *I have neither given nor received help on this quiz.* Initials: \_\_\_\_\_

4. For the op amp circuit shown

- (a) Solve for the load current and put it into the form  $i_L = Av_I + Bv_L$ , where you must specify  $A$  and  $B$  as functions of  $R_1$  through  $R_5$ .
- (b) What is the condition on the resistors in the circuit for  $i_L$  to be independent of  $v_L$ , i.e. the condition that the load sees a constant current source?
- (c) What is the transconductance gain  $i_L/v_I$  if the circuit is a constant current source?



5. Solve for  $v_O$  as a function of  $v_1$  and  $v_2$ .

