ECE 3050 Analog Electronics Quiz 1
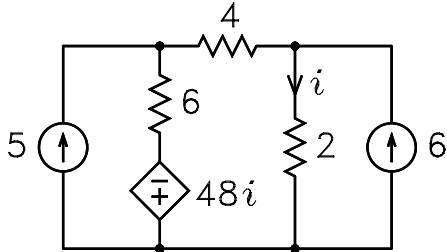### May 20, 2009

Professor Leach   Last Name:_____First Name:_____

Instructions. Print your name in the spaces above. Place a box around any answer. **Honor Code Statement:**
I have neither given nor received help on this quiz. Initials _____

1. Use superposition, Ohm's Law, voltage division, and current division to solve for i.

$$i = 5\frac{6}{6+4+2} + 6\frac{6+4}{6+4+2} - \frac{48i}{6+4+2} = \frac{90}{12} - \frac{48i}{12}$$

$$i = \frac{90/12}{1+48/12} = 1.5\,\text{A}$$

2. There are three small-signal parameters derived from slopes of curves that model the terminal characteristics of the BJT. These are the transconductance g_m, the base-emitter resistance r_π, and the collector-emitter resistance r_0.

   (a) What are the names of the three curves?
   the transfer characteristics, or the plot of i_C versus v_{BE}
   the output characteristics, or the plot of i_C versus v_{CE}
   the input characteristics, or the plot of i_B versus v_{BE}

   (b) How is each parameter defined in terms of the slope of a curve at the dc operating point?
   g_m is the slope of the transfer characteristics at the Q-point
   r_0 is the reciprocal of the output characteristics at the Q-point
   r_π is the reciprocal of the input characteristics at the Q-point