

ECE 3455
 SPRING 2001

QUIZ 1 SOLUTIONS

A current amplifier and a voltage amplifier are shown below. They are connected by a $30\ \Omega$ resistor. A load R_L and a signal source i_s are attached as shown. The gain parameters A_{vo} and A_{isc} are not specified, but it is known that for a current input of $1\ \text{mA}$ (rms), the output voltage is $-1\ \text{V}$ (rms).

- Find the gain $A = v_o/i_s$ in terms of the parameters A_{vo} and A_{isc} .
- Draw a single amplifier model that is equivalent to the cascaded pair in the diagram, and that has the same gain v_o/i_s . Choose the model that is the most "ideal" based on the input and output resistances of the cascaded pair. For your model, specify values for the input and output resistances and calculate a value for the gain parameter.
- The maximum power delivered to the resistor R_{iv} is $1\ \text{mW}$ for an input of $1\ \text{mA}$ (rms). Find the values of A_{vo} and A_{isc} .

