American University of Beirut  
Department of Electrical and Computer Engineering

EECE 310 – Electronics Fall 2011 – 2012

*Due Wednesday December 7, 2011 at 9:00 am*

**Homework 8**

**Problem 1.**

An voltage amplifier has a voltage gain of 99 V/V when a 33 kΩ load is connected. When the load becomes 39 kΩ, the voltage gain is found to be 108.

1. Find the open-circuit voltage gain of this amplifier.
2. Find the output resistance of this amplifier.
3. When a signal source with a source resistance of 47 kΩ is connected to the input of the amplifier, the signal voltage is found to drop to 0.76 times its value when the signal source is open-circuited. Find the input resistance of the amplifier.

**Problem 2.**

1. An amplifier has an input resistance of 150 kΩ, an output resistance of 35 kΩ, and a short-circuit current gain of 200. Draw the *voltage amplifier model* for this amplifier, including numerical values for all parameters.   
   Repeat for the transconductance amplifier model.
2. Three amplifiers similar to the one described in (a) are cascaded. Find the input resistance, output resistance, short-circuit current gain, short-circuit transconductance, and open-circuit voltage gain for the cascaded amplifier.
3. Find the overall voltage gain *vo*/*vsig*, in V/V and in dB, when a signal source with a resistance of 200 kΩ is connected at the input of the cascaded amplifier, and a load with a resistance of 56 kΩ is connected at the output. Find the current gain and power gain in dB.