

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 k $\Omega$  load is connected. When the load becomes 39 k $\Omega$ , the voltage gain is found to be 108.

- a) Find the open-circuit voltage gain of this amplifier.
- b) Find the output resistance of this amplifier.
- c) When a signal source with a source resistance of 47 k $\Omega$  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.**

- a) An amplifier has an input resistance of 150 k $\Omega$ , an output resistance of 35 k $\Omega$ , 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.
- b) 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.
- c) Find the overall voltage gain  $v_o/v_{sig}$ , in V/V and in dB, when a signal source with a resistance of 200 k $\Omega$  is connected at the input of the cascaded amplifier, and a load with a resistance of 56 k $\Omega$  is connected at the output. Find the current gain and power gain in dB.