

ENGR-356
HW#2

Due Friday

Read pages 59-72 in chapter 2 of the text.

Do the following problems from chapter 1 topics:

- 1) A voltage amplifier with an input resistance of 40k ohms, an output resistance of 100 ohms, and a gain of 300 V/V is connected between a signal source and a 100 ohm load. The signal source has an open-circuit voltage of 10mV and a 10k ohm source resistance.
 - a) What output voltage results?
 - b) What is the voltage gain from source to load?
 - c) What is the power gain from source to load?
 - d) If the output voltage across the load is twice that needed and there are signs of amplifier saturation, suggest the location and value of a single resistor that would produce the desired output. Choose an arrangement that would cause minimum disruption to an operating circuit (for example, if a circuit is operating and you place an additional component in series with part of the circuit it would be a major disruption and not good)

- 2) Assume you have a photo diode with which you wish detect light level and you desire to have a voltage that is proportional to light level. Recall that a photo diode will create a current proportional to light level (model it as an ideal current source). Sketch an appropriate circuit, using an appropriate amplifier model, where the amplifier has a 200 ohm input resistance, output resistance of 100 ohms, and is driving a 1k ohm load. When the photo diode creates a 100 microamp signal a 2 volt signal is desired across the load. What open-circuit transresistance does the amplifier need to have to meet this specification?