

EE 315 – Module #1 Practice Problems

1. For a given amplifier, you are given the following information.

- The source is a microphone that produces a sine wave with a peak input signal of 0.2 V and 1mA.
- The output drives a 100 Ω resistor that absorbs 48.4 mW of average power.
- The DC supplies are $\pm 3V$ with dc currents of 20mA (assume average quantities).

Find the following:

- a. Voltage gain, Current gain, and Power gain in ratio units and dB units
- b. Amplifier efficiency
- c. Power dissipated by the amplifier

2. An amplifier provides linear operation at a gain of 200 V/V. You are given the following information about the clipping levels for given DC supplies.

DC supplies	Input at which Clipping occurs
$\pm 2V$	$\pm 0.00850 V$
$\pm 5V$	$\pm 0.02150 V$
$\pm 10V$	$\pm 0.04250 V$

Find the output voltage range for each power supply level and at what the percentage of the DC supplies does the output clips.

3. An amplifier with a gain of 1 V/V has an input resistance of 1M Ω and an output resistance of 40 Ω . A source with a peak 2 volt signal and a 200k Ω resistance is utilized as an input to drive a 150 Ω load. Draw the circuit and find the voltage, current and power gains in ratio units and dB.
4. You have a 10mV, 100k Ω source that will drive a 50 Ω load. You are given the following amplifiers to cascade between the source and load. What combination works best? Why?

	Voltage Gain (dB)	Ri (Ω)	Ro(Ω)
Amplifier I	40	10k	10k
Amplifier II	6	100k	20