Homework 2 ECE320

Reading:

1. Look over the following MIT OCW Circuits/Electronics lectures:

Inside the Digital Gate (Lec 5); MOSFET Amp – part 1 (Lec 9); Second Order Systems – part 1 (Lec 15)

2. In Wikipedia or similar source, read up on the following:

Amplifier, Cat whisker detector, Coherer (radio), Vacuum tube.

3. Look up the schematic for a simple AM Crystal Radio.

Turn in the following:

1. In the characteristic equation of a second order circuit, describe the difference between using zeta to describe the perfect square vs. using Q (Quality factor).

Recall that one way of finding the characteristic equation is from D(s) = 0, from the transfer function T(s).

2. Using the TopSpice MOSFET I-V example simulation, or from Lec 9 above, explain how a transistor can sometimes be modeled as a switch, while at other times is modeled as a voltage controlled current source.

3. Write a summary paragraph for each of the following topics:

a) Diode in a Cat Whisker Crystal Radio
b) Coherer
c) Edison effect and the Vacuum tube amplifier

4. Explain how the following circuit can be used as either a logic inverter or an amplifier.