GENERAL SUGGESTIONS FOR TAKING THE FINAL EXAM

1. Start by reading through the entire exam quickly, and answering the easy questions first, then go back and spend more time on the harder questions.

2. Be sure to read each question thoroughly and provide all the responses requested. For example, if the question asks you to find the voltage and current, be sure to write down both answers.

The final exam for this class contains 64 questions drawn from, and in the same form as the homework and quiz questions you answered during the class. Thus some questions are in multiple choice form, some true-or-false, some fill-in-the-blanks, some requiring you to draw a schematic diagram, and some requiring you to calculate a numerical answer or explain something in words. No Scantron answer sheet is required. It is an “open book” exam, so be sure to bring your textbook, your calculator, pencils and paper.

In order to pass the final exam, you will need to be able to do the following:

**JFETs**

1. find missing values of voltage, current, and resistance in a given JFET circuit using Ohm’s Law, Kitchoff’s Laws, and the JFET formulas.

**CE AMPLIFIER**

2. determine missing DC values of voltage, current, and resistance in a given common emitter (CE) amplifier circuit.

3. determine missing values of instantaneous AC or varying DC voltages in a given CE amplifier circuit, and voltage waveforms at specified points.

**MOSFETs**

4. match a given type of FET (JFET, D-MOSFET, E-MOSFET, either n-channel or p-channel) with its symbol and characteristic curve.

5. determine missing values of voltage, current, and resistance in a given MOSFET circuit.

**DIFFERENTIAL AMPLIFIER**

6. determine missing values of voltage in a given ideal differential amplifier with voltage gain specified.

7. determine missing values of voltage in a differential amplifier circuit constructed from two NPN transistors, and determine the gain of this amplifier when used with differential or single-ended inputs, or differential or single-ended outputs.
COMPARATORS

8. determine missing values of voltage, current, and resistance in a given IC comparator circuit with open-collector output.

9. design a comparator circuit that uses an IC and satisfies given specifications, or given the transfer characteristic—simple inverting or non-inverting, Schmitt Trigger, and window comparators.

10. identify a comparator circuit given the schematic or transfer characteristic.

OP AMP AMPLIFIERS AND FILTERS

11. identify a given op-amp amplifier type, including inverting, non-inverting, and voltage follower.

12. determine missing values of voltage, current, resistance, and voltage gain in a given op amp circuit with negative feedback.

13. design an op amp amplifier to given specifications.

14. determine missing values of voltage, current, voltage gain and resistance in a given op amp AC amplifier.

15. determine the frequency response curve for a given op amp filter circuit, high pass, low pass, and bandpass, or design an op amp filter circuit given the desired frequency response curve.

POWER AMPLIFIERS

16. determine missing values of voltage, current, and voltage gain in a given complementary symmetry or common collector transistor power amplifier.

AMPLIFIER TROUBLESHOOTING

17. determine the faulty component in a given amplifier circuit, given readings of DC and AC voltages in the circuit.

OSCILLATORS

18. state the conditions for oscillation of an amplifier.

19. design an op amp based phase shift oscillator or square wave oscillator to given specifications, and sketch the voltage waveforms at specified points in these circuits.

OPTO-ELECTRONIC DEVICES AND CIRCUITS

20. match the various opto-electronic devices studied in the class with their characteristics, descriptions, or applications, including the LED, phototransistor, photoresistor, photodiode, opto-coupler, opto-isolator, and fiber optic cable.
ANALOG SWITCHES

21. determine missing values of voltage or current in a given analog switch circuit, or design an analog switch circuit to perform a specified function.

VOLTAGE REGULATORS

22. determine missing values of voltage, current, and resistance in a given voltage regulator circuit—zener diode, three-terminal IC regulator with fixed output voltage, or three-terminal IC regulator with variable output voltage.

23. design a voltage regulator to given specifications—zener diode, three-terminal IC regulator with fixed output voltage, or three-terminal IC regulator with variable output voltage.