Examination Feedback for EEE340 – Analogue and Switching Circuits
Autumn Semester 2011-12

Feedback for EEE340 Session: 2011-2012

Feedback: Please write simple statements about how well students addressed the exam paper in general and each individual question in particular including common problems/mistakes and areas of concern in the boxes provided below. Increase row height if necessary.

General Comments:

I am disappointed by the lower than usual raw mark average on this paper. Looking at the attempts at some of the questions it is evident that some candidates focus their revision by spotting questions based on the recent exam papers rather than to develop an understanding of the underlying techniques. What is worrying is that some candidates struggle with exam questions that are very similar to the ones posed on the tutorial sheets.

Question 1:

a) Some candidates drew MOSFET or reverse recovery waveforms others drew Baker clamp waveforms.
b) Used v = L dt/dt. A relay coil with inductance and resistance is a 1st order network, this is first year stuff.
c) As above
d) Some, when working out the equations, assumed Rs is connected in parallel with R. Again, first year stuff.
e) Many were confused about what happens during turn-off which lead to incorrect derivations. When T turns off, D is forced into conduction. At this instant the relay coil has a current of iL = Vs/R flowing through it. Thus, Vc = Vs+Vd+iLRs.

Question 2:

a) Most attempted this well.
b) Problems here were due to incorrect connection of the current limiting transistor and resistor. When it came to calculating power loss some chose to calculate the power loss in the current limiting resistor and claim this as transistor loss during a short circuit - remember the transistor has to support all the supply voltage.
c) Some struggled with Ohm's law quoting V^2R or I^2/R for power. Some also used the current limit value of 8A to determine loss in the transistor and current sense resistor.
d) A number could not remember the definitive op-amp equation $Vo = Av(v^+ - v^-)$ and some forgot the vbe drop of the transistor.

Question 3:

a) Some omitted the incremental gains, other the transition points.
b) Should be based on an inverting amplifier, some swapped the connections on the op-amp.
c) Many people struggled with the connection of the transistors. Other struggled with the rules of logarithms.
d) Incorrectly drawn circuit diagrams with missing feedback or incorrectly connect heat sensor.

Question 4:

a) Many forgot the circuit when diode turns off and the capacitor is the only energy source in the circuit.
b) Some missed the turn-on and turn-off times. A few candidates drew vL with just a positive voltage. In a steady-state condition the average voltage across an inductor over a specific time period should equal zero.
c) Some candidates derived the correct equation but did not obtain a final answer for the output voltage because they did not have a value for ton. The switch is driven by a square wave so ton = T/2 = 1/150e3.
d) Similar to above.