Examination Feedback for EEE307/EEE6023 – Power Electronics
Spring Semester 2014-15

Feedback for EEE307/6023 Session: 2014-2015

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:

Most students were able to show a competent knowledge of the questions asked, however quite a few students were incapable of recording any useful information regarding the question, and often made glaring mistakes based on simple maths/unit conversion (difference between nF/uF/pF). Many students seem not to have read the question, but have recognized the structure/figure/paragraph and then repeated a previous exam solution (e.g. Q1 c: Asks for paralleled BJTs but diodes were given in answer).

Question 1:

Accuracy of waveforms a problem.
Far too often the difference in energy stored is neglected and total energy equation used incorrectly e.g. 0.5C(v2-v1)^2 as opposed to 0.5C(v2^2-v1^2).
Snubber components in wrong circuit position/neglected.
Many students seem not to have read the question, but have recognized the structure/figure/paragraph and then repeated a previous exam solution (e.g. Q1 c: Asks for paralleled BJTs but diodes were given in answer).

Question 2:

(a) Structure well approached on average with most students capable of full derivation.
(b) Considering that there are two input voltages and two output currents, appreciation of correct output current condition was rarely met and then two capacitance and inductance values should have been found and the values that satisfy the inequality (often neglected in the equation given) chosen and compared to preferred manufacturer values. Many students stated “at minimum output current and maximum input voltages” and calculated only one value of inductance/capacitance. This statement is not always true.

Question 3:

Despite asking for an inductive load description, many students described resistive load waveforms and used the incorrect average switching power loss equation.
Many students unable to specify duty-cycles of operation or added in duty cycle effects where unnecessary
Almost all students calculated the power dissipated when operating in the 33% portion of the time period, but neglected the 67% for continuous loss
Several students seem to think that 33% + 77% = 100%
When asked whether thyristors would be a suitable replacement technology, many students believed that they would replace the freewheeling diode and not the MOSFET switching devices

Question 4:

Almost all students realized the circuit was a boost converter and derived operational equations successfully.
Considering that there are two input voltages and two output currents, appreciation of correct output current condition was rarely met and then two capacitance and inductance values should have been found and the values that satisfy the inequality (often neglected in the equation given) chosen and compared to preferred manufacturer values. Many students stated “at minimum output current and maximum input voltages” and calculated only one value of inductance/capacitance. This statement is not always true.
Voltage and particularly current ratings were not correctly considered and appreciation of diode and capacitor features rarely shown