Examination Feedback for EEE6040– High Speed Electronic Devices
Spring Semester 2013-14

Feedback for EEE6040 Session: 2013-2014

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:

Mark averages for all questions were good and fairly consistent. Q4 scored the highest and Q3 the lowest, but the difference was only 1.2 marks. Q2 & Q4 were the most popular, Q3 the least, but again the differences are not great. Some very high scores and just a few very poor.
Although one of two incomplete questions were seen at the end of the scripts my overall feeling is that students divided their time very well and were not significantly hampered by time constraints. This is better than what has happened in previous years.
One or two scripts very difficult to read and a few with very poor quality diagrams.

Question 1:

Some good scores for 1a. For 1b, a few failed to mention some important points, particularly in respect to operating principles and manufacturing issues. Important to realize that the MOSFET can be both enhancement and depletion, the MESFET has a higher channel mobility due to it being bulk-like and that MOSFET scaling will lead to a very thin oxide which must be of high quality. A few with errors in the calculation of 1c. 1d generally answered well, but with a few missing some details.

Question 2:

Some very good answers to 2a, but some lacking in important detail. Use of strained channels (SiGe) to alter the valence band structure and raise the hole mobility not well covered. Some mention use of wide gap III-Vs but this would not be appropriate here. In 2b it is clear that some do not know the difference between output and transfer characteristics and that a few did not produce diagrams for the depletion mode MOSFET. Most did 2c well, but a few missed marks due to a lack of discussion on means to increase the speed.

Question 3:

Most students did very well with Q3a, but there were a few who were confused in the assignment or were unable to state which were capacitance or resistance related. The calculation resulted in quite a wide range of answers from correct to very close (marks allowed) through to several orders of magnitude out. Q3b was anew question and most did reasonable well on it, with a few errors on the values.

Question 4:

Most students did well in the assignment of parameters in Q4a. Most understood and drew a good diagram for the Early effect, but surprisingly quite a few did not try what is quite a simple calculation. Students should have realized that values of the order of 10-100V are reasonable for the Early voltage. Most students did 4c very well, but a few did not provide a good discussion on improving the fT value. Some good drawings and discussion of 4d were made, with the odd paper providing other things (MESFET, HEMT) instead of the HBT. Discussion of the effect on the transconductance was a little weak in some scripts.