Examination Feedback for EEE6040 – High Speed Electronic Devices
Spring Semester 2012-13

Feedback for EEE6040 Session: 2012-2013

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 have attempted questions 1,2 and 3. I a little surprised by this as question 4, which consists of multiple parts, can be considered as a lower risk question since I am assuming that you will be able to answer a significant part of the question which was based on bookwork.
Some students have not written the answer clearly, making it difficult to interpret their answers.

Question 1:

a) Quite a few students have used descriptions of MOSFET rather than MESFET, hence losing marks.
b) A number of students made simple error of not converting the cm^{-3} to m^{-3} in this question, despite several reminders to use convert the unit in my lectures.
c) The questions ask for 2 modifications to improve f_T. Most of you provided suitable suggestions but a number of you did not provide explanation of your approaches (hence losing marks).

Question 2:

b) A number of students provided a general statement when the question requires discussion of the limitation of approaches proposed in part (a). For instance, some students suggested that base region doping should be increase in part (a) and stated doping cannot be increased above a limit without providing the reasons.

c) Students who didn't do well in this part provided a very general description of HBT rather than specific description of how incorporation of Ge improves SiGe HBT.

Question 3:

ai) Here I was looking for description of the effects of the parameters. For instance, Cox increases as oxide layer is reduced. In addition the influence of Cox on V_T is very strong and hence large Cox is required to achieve low V_T. Instead some of you provided very short answer such as "Cox increases V_T decreases". Similarly you should discuss that N_A increases during scaling and discuss how it affects V_T.
b) This is closely related to part (a) and you should provide some discussion on the trend and the influence of each parameters on MOSFET.

Question 4:

Very few students attempted this question although there is significant "bookwork". Some common mistakes are

i) Wrong thickness used. The drift region thickness should be used to estimate f_T.
ii) Did not use consistent unit in the calculation.
iii) Provided poor band diagram without labels.