Examination Feedback for EEE105 – Electronic Devices
Autumn Semester 2010-11

Feedback for EEE105 Session: 2010-2011

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:

The paper was generally answered well. However, candidates are reminded to try to lay any derivations or calculations out in an understandable manner. It is difficult for the examiner to award marks for correct working out if only a few scribbled numbers are presented. The use of correct units is also to be remembered. Whilst marks were not deducted –spelling, terminology and precise vocabulary was an issue. Candidates are reminded that "a Doner" is a kebab!

Question 1:

This was the most popular question, probably due to it being the first material presented in the lectures. (a) and (b) were generally correctly answered. For (c) some students missed out units here, and some failed to calculate the conductivity including both electrons and holes as this is the intrinsic case. For (d), the identification of As as a donor was important but the aim was to correctly use the $ni^2=np$ equation. (e) required assumptions to be made with regard to the effective mass (any and all assumptions were accepted!) and the final section required a discussion on ionized impurity scattering and phonon scattering.

Question 2:

Part (a) was generally well answered. There were some issues regarding precision of English w.r.t. holes, electrons and ionized acceptors and donors. Part (b) was a little more hit-and-miss. Some students failed to attept this section of this question whilst others provided a sketchy outline of the derivation – more akin to remembering a few key steps rather than the full derivation as was presented in the lecture notes. For part (c) some candidates mistook zero bias to mean flat band (i.e. V0 applied as a forward bias). Some candidates failed to label the conduction and valence bands, or comment on the change in depletion region width.

Question 3:

This question was very similar to one appearing in a past paper, and ought to have been very easy marks for the candidate if suitable past paper practice had been undertaken. Some answers were somewhat confused as to the effects of diffusion (i) whilst the rest were generally well answered. Few candidates discussed the exponential decay of excess carrier population in part (iii). Part (b) was very similar to a tutorial question and required the identification of the equation for total current, setting it to zero and differentiation of the function provided.

Question 4:

For part (a) some candidates failed to address each of the points laid out – instead providing a detailed regurgitation of all the notes they could remember on BJTs….The current gain (iv) – due to difference in carrier lifetime and transport time in base was the section least well answered. Part b (i) was similar to tutorial questions, but was often left blank. Part (ii) required the identification of the conductivities to be the key parameter – although one candidate took a long and painful route to calculate this a different way!