Examination Feedback for EEE105 – Electronic Devices
Autumn Semester 2005-06

Feedback for EEE105 Session:2005-2006

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 ne

General Comments:

Overall students found this exam harder than I expected. There also seems a significant number who did well on the basic conductivity aspects of the course (Q2) but could not manage a good attempt at any of the semiconductor device aspects (Q1, Q3, Q4). More than a quarter of the class got more marks for Q2 than the other two questions they attempted put together!

Question 1.:

About 1/3 of students attempted this question. Very variable answers. Issues:(a) Most students made a successful attempt at this derivation. (b) Some good definitions of the two terms, but most people forgot that it was a pnp rather than npn transistor... (c) less people got this out than expected - it basically involved combining the equation derived in(a) with the appropriate definition in (b). Also a few students mixed up the electron and hole mobilities. (d) difficult -- some good starts, but only one student got the key point which was that the minority carrier lifetime is inversely proportional to the majority carrier density.

Question 2:

All students attempted this question which was generally done fairly well. Issues: (a) There is no bond breaking electron-hole pair formation in a conductor (or metal). (b) Some students confused about concept of drift. (c) Some students forgot that 1 mm2 is 1x10-6 m2. (d) mixed responses as expected (e) mixed responses -- key issue was to use temperature difference. (f) only one or two students got this out using the model solution. However, a few more correctly identified that it could be solved using averages -- only a few of these stated clearly how they came to the conclusion that this was a valid method though.

Question 3:

Vast majority of students attempted this question, very variable quality of answers. Issues (a) Many students made a good attempt as expected. (b) Disappointing that so many students went off the rails here as it was straight out of the notes. Many "proofs" that did not stack up mathematically. (c) most students got two marks here. (d) Many students appeared to fail to recognise that the answer here was easy if you used the equation derived in part (b) using reverse bias as indicated in (c). Also the question was a planar JFET so the depletion region constricts the channel from only one side, not both. (e) Difficult - very few correct answers here. Note you cannot modify the ratio of Ga and As to change the doping.

Question 4:

A majority of students attempted this question, but few good answers. Seems like most students had not revised this area of the course well, which was not as I expected as many parts of the question were similar in concept to a question in last year's examination. Issues (a) Surprisingly few sensible descriptions of a photodiode and even fewer sensible I-V characteristics. This was supposed to be bookwork... (b) Most students managed something sensible here -- no marks for anything with a power supply though. (c) given that few got the first part out it was unsurprising that that virtually no-one came up with a sensible description. Lots of plots that looked like a transistor characteristic which were all completely wrong -- just because the concept of a load line was met in a particular area does not mean to say it is the only way it can be used. (d) most people got their three marks here. (e) a few good answers.