Examination Feedback for EEE6002 – Principles of Semiconductor Devices & Circuits.
Autumn Semester 2007-08

Feedback for EEE6002 Session:2007-2008

General Comments:

Overall most of the students seem to have answered most of the questions and there are some excellent results. However there are a few students with very poor performances.

Students do not seem to have suffered in general from an inability to understand the questions or from serious time constraints

Question 2 would seem to be a little too easy judging from the scores. Questions 1 and 3 seem to be about the right level. Question 4 looks like it has suffered a little from being the last question, with students being short of time

A very poor level of English grammar is given by many students in descriptive answers.

Many students fail to give really clear diagrams. Many are incredibly compact (some almost postage stamp sized) and really very difficult to read. Some leniency has been given to these students when perhaps marks should have been removed for lack of clarity.

Question 1:

Questions 1a &b should be fairly straightforward from course notes and the majority of student found this so. There were a few students who tried to make the questions far more complex than they are, by going into some deeper theory (usually inaccurate) to make attempts at these. A few students also made very basic calculation errors. Clearly not all students understand the very simple process of compensation doping.
In 1c, a few students did not understand what was meant by an energy level diagram, or an energy level diagram under forward bias. The majority could describe the difference between direct and indirect gap very well and the majority knew how to calculate the wavelength of the photon, although a surprising number then messed up a relatively simple calculation
In 1d, many students could describe the light intensity-current characteristics of an LED or a LASER, but not both. Very few attempted to draw the spectral characteristics. Most student were able to describe some advantages of optical fibre communication, but very few had more than 2 reasons, many students did not really say 'why' and many had answers that were completely irrelevant.

Question 2:

In general there was a very good scoring from this question.
In 2a, most students could describe the Schottky and Ohmic M-S junction, though sometimes there was a lack of clarity in the diagrams and missing information. A few students got the configuration the wrong way round. In 2b most students knew how to calculate these current values. However quite a few made a mess of a very straightforward calculation. Most knew the reason why the MS junction is preferred for high speed. Only a few gave a really good explanation, however.
Most students gave good diagrams for 2c, but many are not appropriately sized (too small/difficult to read).
Question 2d was answered very well by the majority of students. A few students suffered from very basic calculation errors.

Question 3:

(a) (i) This part was done very well by most students and very few marks were lost.
(a) (ii) No real problems with this part either. Some students were confused by the presence of the open-loop dc gain figure given in the questions – this was not needed but some students tried incorporating it into their equations in any way they could! Also, the unit for gain is not ohms.
(b) (i) Calculating the noise factor of the amplifier was done badly. Very few students drew a diagram which probably would have helped them tackle the question better.
(b) (ii) The final part was done better but several students were confused between rms and mean-square noise voltages, and which can be added together.

Question 4:

(a) Despite being asked to recall a fairly basic part of the notes, many students failed even to draw the hybrid π model correctly. Those who did, generally gave very poor descriptions such as "r_{be} is the resistance between the base and the emitter", etc. This does not describe the physical origin of the resistsnce.
(b) (i) This part was done better, though answers were often muddled, showing that a number of students were not sure what they were doing. Knowing how to approximate the capacitors (e.g. by shorts or opens) was crucial to the answer but many students appeared to just guess.
(b) (ii) and (iii) The final parts were done well and most students managed to calculate the upper -3dB frequency correctly. As usual though, calculations were often less than clear.