

Examination Feedback for EEE337 – Semiconductor Electronics
Spring Semester 2014-15

Feedback for EEE337 Session: 2014-2015

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:

Overall, in questions with calculations, students did well. However there are also errors in some questions that could be avoided if the students read the questions more carefully.

Question 1:

Most students did well. However for part 1(c) a number of students did not describe how the solar cells should be connected. In part 1(d), some of the students provided descriptions for PERL cell but the answers are too short and lacking details.

Question 2:

It is a surprise that students appear to not have read the question carefully as it was stated that the InP is the p and n layer of a pin diode. Therefore a number of students failed to describe the advantages of using InP. InP is transparent at 1550nm, and hence loss of carriers through recombination is reduced. Lower diffusion current, and hence lower dark current can also be obtained using the wider bandgap InP. For 2(a) iii, some students calculated transit time limited bandwidth instead of RC limited bandwidth. In 2(b) most students provided brief answers lacking in details, such as how the thickness of the depletion should be smaller than 0.53 μm and provide comments on the size and capacitance of the required diode. In 2(c) i) gain should be calculated at 10V not at 0.9V_b. It can be easily shown that the signal is below the dark current. In 2(c) ii, noise calculation is not required, as we simply need to work out the gain required so that multiplied photocurrent is larger than dark current.

Question 3:

Most did well in 3(a) however in 3(b) a number of students provided description of double heterostructure LED, which is not a suitable structure for high brightness GaN LEDs. Instead the answer should focus on features in the MQW InGaN/GaN with flip-chip, substrate removal, roughened surface, bottom contact and use of high thermal conductivity substrate.

Question 4:

Some of you provided very poor (or wrong) sketch of the band diagram in 4(a). In part (c) and (d) a number of students failed to describe resonant tunneling diode. Instead they discuss tunnel diodes.