Examination Feedback for EEE6008 – Reliability & Failure
Autumn Semester 2011-12

Feedback for EEE6008 Session: 2011-2012

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 exam performance was poorer than anticipated, with particularly poor attempts made at questions 3 and 4. Only a small handful of candidates made consistently good attempts at all 3 questions attempted. Questions 1 and 2 were attempted by the vast majority of candidates and scored a much higher average than questions 2 and 3. Candidates generally experienced difficulty with questions testing a deeper understanding of a process, and often failed to discuss or describe important processes with sufficient detail or clarity. Coursework was typically of a good standard, with many very good attempts at reliability mathematics in coursework one, and some excellent presentations for coursework 2 (however, some reliance on a limited number of sources was sometimes noted).

Question 1:

Part a was generally good. Marks were typically lost for not labeling axes, poor plotting resulting in erroneous values for subsequent parts of the question. Some unusual choices of a-axis scale and not taking into account that N=50 were the main mistakes encountered. Many failed to read off the %age of failed components from the plot in part a) v. Part b) i, ii were answered very well. However, most students struggled with b) iii (surprisingly not getting as far as plotting incremental reliability and %age comparative reliability as we had done together in the lecture), and poorly labeled plots were the main problem in b) iv.

Question 2:

Explanations of junction burnout by ESD were varied. Some ignored the thermal effect and others did not relate to semiconductor junctions. Diagramed typically helped those with good explanations. Strategies to avoid ESD were generally very good. Most answered part b very well, but a large number of students didn't realise that J= I / Area, and some started calculating power dissipated instead (presumably as in a worked exampled they had memorised). There were some poor descriptions of how EBIC could characterize ESD for part c, and some poor descriptions of radiation damage to components in optical fibre systems – knowledge of what a PD, laser and optical fibre was in general very worrying.

Question 3:

Part a was typically answered well. Part b was generally very poorly answered, with a wide range of incorrect processing defects being quoted from unrelated processes. The question on dielectric breakdown in part c was also very poorly answered. Those mentioning thermal runaway were closest. Very few students could recall the form of the example ramp voltage dielectic plot, but did know why Weibull probability plots are best for such tests. Some knowledge of hot carrier effects was demonstrated in part e, but very few detailed descriptions and diagrams were presented.

Question 4:

Q4 was generally very poorly answered. Part a was reasonably well answered, although understanding of the processes often appeared fairly vague. Part b was well answered by the majority, up until discussion of a suitable characterization method for detecting popcorn failures – those that did identify a method failed to discuss it. This part did probe a deeper understanding of methods and when they should be used. Part c was mixed. Some appeared to not have heard of electromigration and resultant stress gradients! Part d was ofter just a list and not the descriptions requested, although there were some good answers.