Examination Feedback for EEE123 – Introduction to Electric and Electronic Circuits
Spring Semester 2014-15

Feedback for EEE123 Session: 2014-2015

General Comments:

The exam counts for 80% of the overall module marks, with 4 lab classes making up the remaining 20%.

A significant number of candidates only answered 3 questions and a handful answered more than the required 4 (additional questions were not marked) – ***you should always read the rubric on the front cover of the exam to find out the number of questions that you need to answer.*** This year only about 20% of candidates failed to fill in the numbers of the questions answered on the front cover of the answerbook (which is a vast improvement on previous years)– this puts the marker in a bad mood and they are less likely to be lenient! Some scripts were extremely untidy and difficult to read and more detailed explanations need to be given.

Question 1:

Attempted by about 99% of candidates. Part (a) was generally well answered although some candidates confused the internal resistance of the battery with that of the load. Most candidates use the correct formula for part (b)(i), but used the incorrect values of resistance. Note the question states "the same battery" – i.e. the internal resistance has to be accounted for. Some students even used the 21.5V from part (a) – note that when the load changes the voltage drop across the internal resistance, and hence the battery terminal voltage, will change. Using the incorrect values of resistance (not accounting for the internal resistance) did give a value for the temperature which was close to the actual answer by coincidence, but this did not gain full marks! Ignoring the internal resistance in part (b)(i) gave the incorrect value for efficiency in part (b)(ii) with some candidates stating that the efficiency was 100%. Part (b)(iii) was only answered correctly by a handful of students. The vast majority assumed the loads to be in series and the resultant current was around 11A – a little thought should have told you that the current should be greater than 200A if both the starter and the heater were operational. Again the voltage drop across the internal resistance has to be accounted for. The loads are in parallel with each other and then in series with the internal resistance.

Most candidates correctly answered part (c)(i) but a few confused the turns ratio as 5:1 instead of 1:5. Part (c)(ii) was reasonably well attempted apart from the power calculation – students are still confusing *R* and *Z*, which obviously led to further problems in part (c)(iii). Parts (c)(iv) and (v) caused no real problems.

Question 2:

Attempted by about 99% of candidates. Apart from a handful of candidates who clearly had made little attempt to study for this module, part (a) presented very few problems, apart from part (iii) where a significant number of candidates calculated the VA rather than power. Most candidates again made a good attempt at part (b) although some did confuse VA, W and VAR. The main sources of error were in (iii) where candidates omitted the x1000 (kVA) when calculating the current, or forgetting that the phase angle was negative. Part (c) was either correctly answered or a complete mess depending whether students understood the difference between VA, W and VAR. Part (d) was the most problematic part of the question. For part (d)(i) a significant number of candidates put the capacitor in series with the loads or in parallel with just the inductor – the capacitor is in parallel with the total factory load. Part (d)(ii) was only correctly answered by about 5 candidates. The real component of power is the only quantity that remains unchanged when the capacitor is added, both the VA and obviously the VAR will change. Some candidates did correctly calculate the new VAR, but this is not the VAR supplied by the capacitor – the capacitor reduces the system VAR to this final value. In part (d)(iii) a common error was to take the rms voltage as 400V (from part (a)) rather than 3300V for this part of the question.

Question 3:

Attempted by about 99% of candidates. The main problem in both parts (a) and (b) were identifying which resisters were in series and which in parallel. About half of candidates appeared to have grasped this correctly, whereas the other half came up with some weird and wonderful combinations! Again this comes with practice – not just learning past exam papers. Despite the question requesting the direction of the current many candidates omitted this from their answer. Many candidates used Kirchoff's laws, but did not provide a diagram indicating the currents which made it impossible to award part marks for attempts if the final answer was incorrect. In part (b) finding the Thevenin resistance was the source of major problems (see comments above). For part (c) many candidates attempted to find the Norton equivalent circuit for Figure 3.3, despite the question clearly stating Figure 3.2. Part (d) was a little different from past exams, but noting the source was DC was the key to solving this. At steady state the voltage across the inductor is zero and the capacitor is charge to the voltage across R_2. The current is then determined by the series combination of R_1 and R_2 – note the direction of the voltage source and the direction of the current I_S – the correct answer is -2A but the vast majority of candidates put +2A.

Question 4:

Question 5:

Question 6:

Question 7:

Question 8: