Examination Feedback for EEE350 –Electromagnetic Fields and Devices
Spring Semester 2015-16

Feedback for EEE350 Session: 2015-2016

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:

Section A: Overall, students' performance is OK. The main difficulty comes from the explanation of difference between the concentrated winding and distributed winding and their pros and cons.

Section B: Candidates generally performed well on this section, notably on B1 and B3 (although relatively few students attempted B3). Confusion re: scalar and vector expressions and missing units was a common theme in attempts at Section B.

Question A1:

It is strange that students performed badly at this question. However, similar question did appear in the 2011-12 exam paper, although there is some difference. Most students failed to derive the airgap flux density, which is useful for the following sections such as calculating the flux density in stator tooth and stator yoke. However, as long as students can give the expressions of stator tooth and yoke flux density, marks will be awarded.

Question A2:

The most difficult part of this question is the section A2.C, students failed to derive the expression of minimum magnet length to withstand the demagnetization. But most students have succeeded to answer the sections d and e.

Question A3:

Only 18 students have attempted to answer this question, however, it is supposed to be the easiest of the part A. The main difficulty comes from the understanding of single layer and double layer, concentrated winding and distributed windings. So some students are confused with the questions b and c.

Question A4:

This one is similar to the example given in lecture notes, so students performed generally well. The question A4.c is the most difficult part, most students failed to tell the pros and cons of open-slot and semi-closed students, however, they have been listed in the lecture notes.

Question B1:

This question was answered well by the vast majority of students. Common mistakes were missing units on calculated quantities and some confusion around vector and scalar quantities in part (a). The derivations in part (b) and (c) were generally well done with the odd bit of carelessness creeping in. The final calculation part was done correctly by a reasonably high proportion of candidates, but again units were missing frequently in the answers.

Question B2:

The standard vector operations in part (a) were done well by the majority of students. Part (c) proved a little more problematic with several students messing up the derivation in part (i) in terms of the power of r (usually by not substituting in for R_c). The final part was generally well done and most students spotted the need to use the capacitance to get the charge on the conductor as a pre-cursor to establishing an expression for the electric field from which the appropriate radius could be derived.

Question B3:

Very few students chose to do this question. Those that did, chose wisely as the average mark for this question was high in comparison to the other questions. It is largely a derivation type question rather than a problem solving type question and students who had prepared well for the time-varying field section of the notes were able to produce the derivations accurately. The numerical section at the end was straightforward and posed few, if any, difficulties.

Question B4:

Parts (a) and (b) – which involve the curl functions were answered well by most students. Again missing units was a common oversight in many attempts. Part (c), which deals with a small section of a more extensive derivation from the notes, seemed to cause a lot of problems. Some candidates seem to have simply seen the diagram and automatically gone into reproducing the full derivation of the solution for the magnetic vector potential. This was not what the question was seeking, rather it was after the boundary conditions on the interface (remember the old adage 'read the question'). Many of those that answered the question asked on boundary conditions, were often rather imprecise in their answers, e.g. it is the normal component of flux density (denoted by subscript 'n' or 'y') which is continuous across the interface and not simply 'B'. Similarly, it is the tangential ('t' or 'x') that differs by an amount determined by the magnitude of the current sheet density. Section (e) on Ampere's Law was answered well by many student, although section (f) on practical solutions elicited some odd response, e.g. reduce current. The solutions of putting in a magnetic shield was identified by many students, although often rather vague, e.g. metal screen, rather than being 'magnetic'.