Examination Feedback for EEE220 – Electric and Magnetic Fields
Autumn Semester 2006-07

# Feedback for EEE220 Session:2006-2007

**General Comments:**

The exam was on the whole answered quite well. However there seemed to be a tendency for students to get engrossed in pages of equations and numerical workings without either a word of explanation, or any evidence that they had checked that the values which came out of the equations seemed reasonable. Students would benefit from taking a few moments to think whether numerical answers seem right based on their understanding of the subject.

Some of the common mistakes are listed below:-

**Question 1**:

(a) Although this was generally well done, some students drew field lines and lines of equipotential for two independent charged wires, thus not showing how the two fields interact via superposition.
(b) Many students forgot that Gauss' Law provides a simple and elegant approach to proving the equation, and instead chose to attempt the far more difficult method of treating the line as an infinite number of point sources and integrating along it – this is a much longer proof and more thus there is more scope for making mistakes and loosing marks!
(c) There was a great deal of confusion as to the meaning of the vector **R**. **R** is the vector from the charged wire to the field point, not from the origin to the field point. In addition many students thought the field in between the two charged wires would cancel to zero despite showing a definite non-zero field at this point in their answers to part (a).
(d) This part was quite poorly tackled. The two common mistakes were using the centers of the wires as the limits for the integration instead of the edges of the wires, and not calculating the total electric field correctly.

**Question 2**:

(a) Some students seemed to have misread the question for the first part of this question and derived the equation for the field due to an infinite charged sheet instead of using this equation to show the capacitance of a parallel plate capacitor.
(b) On the whole students found part (b) very easy, although several chose to erroneously half the value of Q obtained by Q=CV in part (ii) forgetting that the plate charges are equal and opposite.
(c) The final part proved a little tricky. Many students correctly calculated the new charge on the capacitor but then divided this charge by the time period to give the average current. This is meaningless as it is the change in charge which causes the current.

**Question 3**:

Question 3 was by far the least popular but those students who did answer it had no major problems with it.

**Question 4**:

(a) The derivations in part (a) were done well on the whole, though students should remember to explain their mathematical steps, and to state clearly any assumptions which they make.
(b) Again, this part was generally well done, though too many students forgot that two forces acted on each of the wires, and superposition is necessary to calculate the total force. Also, the unit for force per unit length is $Nm^{-1}$ not N.