Report on A2 (2007)

157 candidates, mean 59.8, SD 14.82

This year's paper seemed to hit just about the right level. The paper was more straightforward than in the last few years, but still contained enough more difficult parts to challenge even the better students. The Section A problems seemed to cover the syllabus quite well, and there were no questions in either section that were done particularly badly. It was quite noticeable in Section A that the problems that were done badly differed from candidate to candidate.

SECTION A. (Average 63%)

Question 1. 157 attempts, mean 3.6, SD 1.73 A standard problem, done in the homework problem sets, to derive the functional form of the displacement current. The problem was generally done well, although the majority of students applied a somewhat shaky and incomplete logic.

Question 2. 157 attempts, mean 3.5, SD 1.53 A problem examining the standard setup for an optical experiment, which did not prove difficult to most students.

Question 3. 157 attempts, mean 5.7, SD 1.64 The reflection of an electromagnetic wave at a plane interface; generally very well done.

Question 4. 157 attempts, mean 3.64, SD 1.28 A basic question on different types of polarisation, which revealed some conceptual misunderstandings with some of the candidates.

Question 5. 157 attempts, mean 3.5, SD 1.39 A question on spectroscopic resolution, which was reasonably well done, although there was some confusion on the difference between instrumental function and instrumental width.

Question 6. 157 attempts, mean 5.7, SD 2.13 The separation of the two-dimensional Laplace equation in cylindrical coordinates. While this problem was generally well done, there was a surprisingly large number who used spherical coordinates.

SECTION B. (Average 57%)

Question 7. 130 attempts, mean 10.8, SD 3.97 A straightforward Laplace problem in two dimensions with two line charges. The problem was generally well done, even though a large of number candidates again used spherical coordinates. Only a fraction of the students got the last part.

Question 8. 104 attempts, mean 10.8, SD 4.59 A Poynting-vector problem for a capacitor filled with a plasma. The problem was quite similar to problems done in the problem sets. It was generally well done, and no part proved particularly difficult.

Question 9. 132 attempts, mean 13.1, SD 3.80 A problem on using the Michelson interferometer as a Fourier-transform spectrometer to resolve three narrow components of a spectral line. The problem was quite similar to a problem in last year's paper, but more straightforward. It was the Section B problem that was done best. Only a few students gave good answers on the last part.

Question 10. 105 attempts, mean 10.8, SD 3.53 A Fraunhofer diffraction problem for a double-slit set-up. The problem was well done, although it highlighted some conceptual problems (image formation, Fraunhofer limit). It was good to see that the majority of student used the convolution theorem to do the second part.