Examination Feedback for EEE6011 – Antennas and Propagation
Autumn Semester 2011-12

Feedback for EEE6011 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:

The overall exam average is about right.

Question 1:

This is the best answered question.
   (a) Most people answered this correctly. A point to note is that any radiation pattern below the horizontal is invalid, since the groundplane cuts the Universe in two and the only accessible part is the upper half space. Also occasional confusion with a horizontal dipole above a groundplane.
   (b) Quite well answered. Some marks were lost due to big jumps in the theoretical development.
   (c) The size aspect was (hopefully) obvious, but some thought the $3\lambda/4$ rather than the $\lambda/2$ monopole had the largest gain, whereas the gain of the former is reduced by sharing power between the two lobes.

Question 2:

The third best answered question.
   (a) Pretty much bookwork, and marks were lost for not clearly developing the theory.
   (b) (i) Down to remembering the formula linking gain to aperture area. (ii) The interference was coming in on the dish's 1st sidelobe, and its level is just the ratio of two $J_1(u)/u$'s. A mark was lost for not realizing that the unit of (i) is dBi, and (ii) dB. (iii) Only a few realized that circular polarization received linearly causes a 3dB signal reduction.

Question 3:

The second best answered question.
   (a) Most people answered this correctly.
   (b) A few thought incorrectly that the skip distance was $2R\sin(\theta)$ instead of $2R\theta$, and a further few again incorrectly that θ was in degrees not radians. Values for skip distances varied slightly depending on the number of decimal places used in the calculation of θ, and allowance was made for this when marking.
   (c) The idea here was that the lower frequency signal incurred more hops and therefore more lossy ground reflections. Most realized that their calculated skip distances gave 4 hops and one hop at $3.57MHz$ and $7.14MHz$ respectively.
   (d) Two different signal paths are required here with a delay between the two. The most obvious mechanism is additional long path propagation in the opposite direction around the earth since the dipoles radiate equally in both directions. Some realized a delay was required, but no one mentioned the long path.

Question 4:

The least well answered and most difficult question.
   (a) Bookwork.
   (b) The given E field equation needs to be evaluated using the distance between source and field segments.
   (c) Properties of a Toeplitz matrix were asked for here.
   (d) Simple calculations using Ohm's law, but a knowledge of the input resistance of a $\lambda/2$ dipole was required, not Z_{66}.