Examination report – December 2010 series

Paper no 2730 – 023 Advanced Radio Systems

Section 1 – Areas of good performance (question no/syllabus topic or reference)
Syllabus sections: 1.10, 1.11 - Were fairly well done but in many cases lacked needed detail. Few realised that frequency diversity requires more than one receiver. Syllabus section: 1.12 - Many explained antenna gain correctly. Syllabus section: 1.19 – Many were vague about antenna effective aperture. Syllabus sections: 1.19/20 - In the calculations, many introduced a multiplying factor for gain even though I stressed that the reference antenna was an isotrope. Syllabus sections: 1.36, 1.40 - The definition for noise figure was generally given correctly, but few candidates seemed to realise that this parameter is a measure of how much noise a particular unit introduces into a system. Syllabus sections: 1.39, 1.38 - The correct order for part (b) was ABC. Too many candidates failed to convert dBs into numbers before using the formula. Syllabus section: 1.58 - Few candidates realised that the multipath nature of the signal is exacerbated by the mobile's movement. Only one candidate realised that a vital condition for advantageous use of multipath conditions is that at 3840kbits/s path separation must be at least 78m for adequate operation of the RAKE receiver. Syllabus section: 1.59 - The descriptions were by and large acceptable. Syllabus sections: 1.84, 1.86, 1.87 - This question was well done by the stronger candidates - many securing full marks. Most candidates managed at least one or two parts.
Section 2 – Areas for development (question no/syllabus topic or reference)
Syllabus sections: 1.26, 1.28 - Not many candidates could provide a decent block diagram of an FM transmitter. Few realised that pre–emphasis takes place in the load of the audio amplifier. No candidate stated that the real reason for pre–emphasis is the triangular noise spectrum peculiar to FM. Syllabus section: 1.43 - Lack of detail lost marks for many. . Syllabus section: 1.47 - The answer - the introduction of multimedia services - was unknown to most. Syllabus section: 1.48 - Lacked essential detail, few mentioning the use of 8–PSK as the modulation method. Syllabus sections: 1.52, 1.53 - While many candidates adequately showed which sets were orthogonal and which were not in part (a), the explanations as to why orthogonality is essential in the despreading process for part (b) lacked vital information: ideal conditions assumes that wanted and unwanted signals have the same power level and that there is no noise. In practice these conditions are not present and thus mask the difference between wanted and unwanted signals demanding minimum cross correlation.

Syllabus section: 1.80 - Was straight from the syllabus. Syllabus section: 1.77 - Was poorly done with only vague notions expressed in the answers. No candidate differentiated between circuit–switched and packet–switched domains. Syllabus section: 1.97 - This question had the poorest response on the paper. Few mentioned the three vital axes and the corresponding effects of roll, pitch and yaw. Few spoke of the need to keep earth in view for communication and the sun in view for power for the solar panels and the word gyroscope did not appear.
Section 3 - Additional comments
Candidates must read questions carefully to ascertain exactly what is required before attempting answers. Some presentations were poor - candidates must remember that the examiner has to read what they write and if he/she cannot decipher their scripts they will lose marks. Generally a reasonable set of results.