Examination report – December 2012 series

2730-023 Advanced Radio Systems

Section 1 – Areas of good performance
Syllabus reference: 1.10, 1.11. Lack of detail was the feature that marked the response from most candidates to these questions.
Section 2 – Areas for development
Syllabus reference: 1.14, 1.15, 1.18, 1.19. Generally the meanings of the various terms were handled well by most candidates. Few managed the basic calculations in section 1.19. Syllabus reference: 1.23, 1.24. A fair number of candidates did not appear to realise that the final stage in a transmitter is a power amplifier and few mentioned the importance of conversion efficiency. Many candidates did not know the difference between high and low-level modulation and the relative advantages of each. Syllabus reference: 1.37, 1.38. This question was entirely numerical and was omitted by many candidates. Some of those that attempted it demonstrated a distinct inability to handle indices. The calculations for noise factor were beyond the ability of too many candidates. Syllabus reference: 1.41, 1.65. a.g.c. was answered well by many candidates but few appeared to realise what was called for in the diagram: this simply involved how the EU, the BS and the RNC were each mapped to the logical, transport and physical channels. Syllabus reference: 1.52, 1.53. This question gained the lowest average mark on the paper. Few could define orthogonality clearly in part: the essential features being zero cross correlation between codes, synchronisation and zero offset. Orthogonal codes are used in the down link to separate subscribers as synchronisation can be achieved for there is a single source (the BS), for the same reason they cannot be used in the up link to separate subscribers for there are multiple sources (the EUs). The reason that orthogonal codes must be sued in every cell is on account of their limited numbers. Few candidates appeared to know that there are only 512/256 orthogonal codes available for the down/up link which was the essence of the answer. What was needed to be told was that as the number of subscribers is increased, so is the mutual interference between subscribers because one subscriber's signal becomes another subscriber's interference. Syllabus reference: 1.60. Three reasons for power control was answered well in general. The two basic methods of control often secured only vague and indefinite answers. Syllabus reference: 1.87, 1.88. Surprisingly, many candidates did not realise that fade margin is essentially a fudge factor. As already mentioned the calculations were poorly done by those who attempted the question. Syllabus reference: 1.95. Multiple access for satellite communication was known by many but lacked detail in the answers from the majority of candidates.

Section 3 – Recommendations
Questions involving calculations were not attempted by many candidates. The examiner can only conclude that there is a general mathematical weakness among many who sat this examination.