Examination report – June 2012 series

2730-023 Advanced Radio Systems

Section 1 – Areas of good performance
Syllabus reference: 1.9. This section generally received satisfactory answers. Not many realised that intermodulation is caused by non-linearity and can be avoided by using FETs rather than BJTs in the r.f. amplifiers. Syllabus reference: 1.22. Lack of detail in the descriptions cost marks. Too few could do the simple calculation. Syllabus reference: 1.33. The block diagrams required for varied considerably. A good number misread the question and provided a diagram for an FM rather than an AM receiver. The bulk of a receiver's sensitivity and selectivity lies in the i.f. and not the r.f. amplifiers. Few seemed to realise this in their answers. Syllabus reference: 1.41, 1.63. Many candidates secured full marks to both sections. Answers generally lost marks through lack of detail. Syllabus reference: 1.79. Only a few candidates could not provide four threats to security in the UMTS. However, the corresponding descriptions for any two of the threats provided some shaky answers in other sections.
Section 2 – Areas for development
Syllabus reference: 1.12, 1.16, 1.18, 1.20. Explanations for antenna gain and EIRP were varied. Sadly a good number of candidates could not cope with the calculations required for gain and propagation loss in section 1.16. Syllabus reference: 1.51, 1.53. While many candidates gave correct waveforms for the WCDMA situation depicted in part (a), none managed to give the correct waveforms H and J for the integrator output. Syllabus reference: 1.71, 1.73, 1.74. The responses in section 1.74 were somewhat vague in many cases. Section 1.17 secured reasonable marks for those who attempted the question. Syllabus reference: 1.82, 1.83, 1.84. The importance of the Energy of bit-to-Noise density ratio was poorly explained in the majority of cases. The incorrect subscripts in section 1.82/3 did not appear to affect the answers given for the derivation given by candidates and a good number secured full marks for this part. Incorrect answers in section 1.84 arose largely because too many candidates still do not know the laws of logarithms.

Syllabus reference: 1.94. The vast majority of candidates had no idea of how to explain equivalent noise temperature. The importance of the G/T ratio, likewise, did not receive good explanations. Unsurprisingly, only a handful of candidates got full marks for the corresponding calculations.
Section 3 – Recommendations
A higher percentage of candidates passed this paper compared to previous years. Candidates must read questions carefully, noting the marks allocated for each part and provide sufficient corresponding detail.