Examination report – December 2012 series

2730-016 Radio Systems

Section 1 – Areas of good performance
Syllabus reference: 1.5, 1.79. Most candidates secured full marks here. The essential features for the answers are that frequency cannot change but velocity is dependent on the medium being a maximum in free space. Section 1.79 was not answered by many and most of those that did misread the question. Syllabus reference: 1.38, 1.40, 1.12. Some candidates appeared to think that above 30MHz the sky wave is used for propagation. The most common blunder was the failure to realise that the numerical value of the distance in the approximate formula is in km while the other quantities are in m. Only one or two candidates could correctly define directivity for in section 1.12. Syllabus reference: 1.52, 1.61, 1.63. The best answered question on the paper, with the majority of candidates gaining full marks. Syllabus reference: 1.98, 1.100. Too many candidates were unable to describe the factors that determine the choice of i.f. such as receiver sensitivity, adjacent channel rejection, image channel rejection and bandwidth. Most candidates managed to calculate the image frequency of 142.4MHz but not many also got the image frequency of 99,6MHz. Syllabus reference: 1.128, 1.123, 1.136. The need for encryption was fairly well known in section 1.128; the need for separate frequency bands for up-link and down-link in 1.123 was not: full duplex can only be achieved in radio with separate bands. Again, too many candidates had very vague ideas as to the reasons for handover in section 1.136.
Section 2 – Areas for development
Syllabus reference: 1.23. Diagrams were generally good but lack of detailed weakened the answers. Few detailed, for example, that compared to the dipole the radiated power and radiation resistance are halved. Syllabus reference: 1.67. A lot of muddle in evidence in the FM definitions. The calculations suffered accordingly with only a few candidates getting them completely correct. Syllabus reference:1.92. The question centred on a radio system. Those who realised this provided good diagrams but failed to match the diagrams with adequate descriptions. Syllabus reference: 1.134, 1.139. Mobility management was a grey area for many candidates, although the short comings of second generation PLMN systems were given by most candidates. Syllabus reference: 1.152, 1.26. This section asked for four sources of external noise. Rain, wind etc are not noise sources. Solar radiation, cosmic background radiation etc were what was called for. The correct answers were any two from radiation resistance, top capacitance and effective height.

Section 3 – Recommendations
• Candidates must read questions carefully.