Examination report – December 2013 series

2730-016 Radio systems

Section 1 – Areas of good performance
Syllabus reference: 1.91 This section produced good results for some candidates.
Section 2 – Areas for development
Syllabus reference: 1.7, 1.95 For the explanations given for how the conditions for propagation of an electromagnetic wave can be satisfied by the field pattern in a capacitor energised at high frequency, few candidates spoke of the formation of the component fields of an electromagnetic wave and the mechanism of its propagation. There was also little mention of noise generated within the receiver in the explanations given for why the signal–to–noise at a radio receiver input determines whether signal information can be identified. Syllabus reference: 1.25, 1.31 Vague and incorrect notions of tuning for a unipole were given although the descriptions for how transformer coupling can be used to connect a radio transmitter output to an antenna feeder fared better. Syllabus reference: 1.21, 1.41 Candidates demonstrated a considerable lack of knowledge as to how an electromagnetic wave creates an electron flow in a conductor. Muddled notions of fading in long range terrestrial communication were also expressed. Long range communication requires surface or sky waves. It is the interaction of these different components that cause fading. Syllabus reference: 1.62, 1.64 Many candidates did not read the question on drawing a simplified circuit for high–level modulation of a high power class C output amplifier stage in an amplitude–modulated transmitter correctly. A circuit was called for, not a block diagram. Syllabus reference: 1.67 Candidates did not perform well in the frequency modulation section. Definitions were largely unknown which also caused candidates to provide incorrect calculations. Syllabus reference: 1.102 Many candidates could not identify the r.f. signal, the local oscillator signal and the i.f. output signal in an outline circuit for a frequency mixer in a superheterodyne radio receiver. For the explanation for the principle of operation, candidates were expected to identify an additive mixer and describe its operation accordingly. Syllabus reference: 1.144, 1.145 The only set of initials that were generally well known from ITU, 3GPP, RACE and ACTS FRAMES was ITU. Syllabus reference: 1.134, 1.136 Mobility management did not secure comprehensive answers and many candidates could not provide four reasons for a handover taking place in a PLMN.

Syllabus reference: 1.34, 1.150
The bandwidths for SSB and colour television were not well known. The mechanisms employed in getting a satellite into geostationary orbit were even less well known. Both techniques require the use of an elliptical transfer orbit. .