

Examination report – December 2014 series

2730-016 Radio Systems

Section 1 – Areas of good performance
<p>Syllabus reference: 1.15 – Describe the increase of driving point impedance and bandwidth obtained by using a folded dipole. Many candidates provided quite good answers for this section.</p> <p>Syllabus reference: 1.131 – Describe the basic TETRA system components, interfaces and operation. Many candidates secured full marks in this section.</p> <p>Syllabus reference: 1.24 – Explain why a counterpoise is used when earthing is poor. This section was reasonably done by candidates.</p> <p>Syllabus reference: 1.55 – Explain the consequences of failing to match the transmitter output stage to its load. Many candidates gave acceptable answers to this section.</p> <p>Syllabus reference: 1.154 – Describe the range of equipment on board a satellite in a geostationary orbit. Fair descriptions were given for an r.f.-to-r.f. transponder in a geostationary satellite.</p>
Section 2 – Areas for development
<p>Syllabus reference: 1.36 – Describe ground wave and sky wave propagation. Many candidates needed to provide far more detail for this section.</p> <p>Syllabus reference: 1.125 – Describe the use of Time Division Multiple Access (TDMA) in modern mobile telecommunications systems. Too many candidates lost marks in this section for lack of essential details.</p> <p>Syllabus reference: 1.66 – Describe the distribution of side frequency components in the spectrum of a sinusoidal carrier, frequency modulated by a sinusoidal tone. Frequency modulation always appears to be a difficult subject for many candidates. Too many candidates could not get the carrier frequency and the modulating frequencies in this section.</p> <p>Syllabus reference: 1.9 / 1.10 – Fundamentals of electronic radiation. Poor responses were given to how straight wires can resonate and form a half-wave dipole.</p> <p>Syllabus reference: 1.106 – Define sensitivity, adjacent channel selectivity, image rejection ratio and output signal/noise ratio for a superheterodyne receiver. Few candidates were able to correctly define the image channel rejection ratio.</p> <p>Syllabus reference: 1.100 – Calculate the image frequency and explain how second channel interference is minimised. Many candidates couldn't do the calculation in this section.</p> <p>Syllabus reference: 1.17 – Distinguish between standing-wave and travelling-wave antennas and</p>

compare their bandwidth characteristics.

There was a lack of essential detail in this section.

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There was a lack of essential detail in the answers to this section.

Syllabus reference: 1.50 – Describe why modulation, or keying, is not carried out at the master oscillator stage.

Candidates could have provided more substance in their answers to this section.

Syllabus reference: 1.82 – Explain that when carrier waves having different frequencies are multiplied together they yield sum and difference frequencies.

Many candidates managed the mathematics to this section, but other candidates tried to answer this section unsuccessfully without the mathematics.

Syllabus reference: 1.84 – Describe the use of heterodyning in the reception of CW.

Few candidates used the results from their mathematical explanation of how two carrier waves multiplied together create sum and difference frequencies to describe how this process can be used for the reception of CW.

Syllabus reference: 1.105 – Describe three-point tracking with the aid of a circuit diagram of a mixer stage.

The majority of candidates produced poor results for this section.

Syllabus reference: 1.121 – With the aid of a diagram, show that in a cellular radio system the coverage area is divided into a number of linked cells, each with a base station.

Most candidates produced diagrams without essential detail for this section and the explanations lacked substance.

Syllabus reference: 1.35 – Describe the frequency band definitions of very low frequency (v.l.f.), low frequency (l.f.), medium frequency (m.f.), high frequency (h.f.), very high frequency (v.h.f.), ultra high frequency (u.h.f.), super high frequency (s.h.f.) and extra high frequency (e.h.f.) using frequency and wavelength classifications.

This section demonstrated that too many candidates are not familiar with the radio bands.

Section 3 – General

Lack of detail in many sections cost candidates marks.