Examination report – June 2012 series

2730-011 Fundamentals of Electronic Communication 2

Section 1 – Areas of good performance
Syllabus reference: 1.14, 1.15, 1.23 – Statistics. Majority of candidates answered this section very well, with method being shown clearly. Syllabus reference: 1.17 – Histogram. Most answers were neatly drawn and accurate using the graph paper supplied. However there were some of a lower standard. Syllabus reference: 1.9, 1.4, 2.8, 2.9 – Number Systems and Logic. These sections were very well answered. Syllabus reference: 2.22, 2.19 – Logic. These sections were well answered by most candidates. Syllabus reference: 5.3, 5.15 – Logarithms. Most candidates gave very good answers for these parts. Syllabus reference: 5.11 – Logarithms. Many candidates could convert from indicial into logarithmic form, but some could not from logarithmic into indicial form. Syllabus reference: 4.5, 3.3, 3.10, 3.12 – Noise, Distortion and Waveforms. These sections were well answered by the majority of candidates. Syllabus reference: 3.11, 3.7, 6.16, 6.17 – Transmission Lines. All sections were reasonably answered. Syllabus reference: 6.7, 7.1 – Transmission and Filters. Many good answers to these questions, however 0dB point did cause confusion for some. Syllabus reference: 7.7, 8.1 – LC Resonant circuits. Majority of candidates gave correct answers to these sections. Syllabus reference: 8.8, 8.13, 8.25, 8.14 – Modulation. Overall this was well answered. Diagrams could have been neater in some cases.

Section 2 – Areas for development
Syllabus reference: 1.13 – Number Systems. This section caused problems; candidates showed little knowledge of hexadecimal addition and only a small minority were able to convert to the BCD answer. Most assumed the values were given in binary and gave the answer in binary or converted the BCD numbers to denary added then left the answer in denary. Syllabus reference: 2.9 – Logic, Deriving Boolean expressions from truth tables. Few gave the correct answers to this section, considering the construction of truth tables from a Boolean expression in a previous section, had a large success rate. Syllabus reference: 2.16, 2.17, 2.18 – Logic. Even though the Karnaugh map was well drawn, many candidates were not conversant with the grouping method and attempted to minimise the expression by Boolean algebra. The use of this method resulted in many incorrect answers. Reproduction of the final expression using only NAND gates also caused problems. Syllabus reference: 5.24. This section asked for the benefits of using logarithms. Many answers were incorrect stating “to make calculations easy”, “minimise figures” or to “simplify calculations”. This is not sufficient to demonstrate understanding. The answer needed to be more specific. Syllabus reference: 4.2 – Logarithms. This section involves two mathematical procedures, a transposition then a logarithm. Mixed ability was demonstrated with some candidates transposing correctly but not being able to use natural logarithms. Some were unable to carry out the initial transposition. Syllabus reference: 4.13 – Noise. Many candidates stated incorrectly that noise caused distortion. Others said it destroyed or obliterated the signal. The signal is still available but can be hidden or masked by noise, causing errors and possible malfunction at the receiver. Loss of efficiency will also occur but the answer should include the factors which result in lower efficiency. Syllabus reference: 4.13 – Noise / Figure and Signal-to-Noise Ratio. Not many candidates understood how to calculate the answers. The main reason being that the noise figure equation was not known. Syllabus reference: 3.14 – Communication Systems. The section asked for a description of the duplex method of communication. Many candidates assumed incorrectly that there were various duplex methods. Diagrams were poor in many cases. Syllabus reference: 6.4 – Transmission Lines. Many candidates misinterpreted or did not know the difference between the terms in this section. For example instead of the term “Attenuation Coefficient” being defined, “attenuation” was defined. Syllabus reference: 7.6 – LC Resonant Circuit. This section caused problems for many candidates. There was confusion between internal and circuit currents and descriptions of impedance were not always related to the LC resonant circuit.

Section 3 – Recommendations
• Candidates are advised to revise their BCD and hexadecimal number systems, as many candidates experienced problems with section 1.13. • Questions should be read carefully, it must be understood that no marks can be allocated to if the wording of a question is not followed. For example, within syllabus reference 2.18, candidate were asked to use the grouping method and then proceeded to use an algebraic method. Syllabus reference 2.17 asked for a diagram using only NAND gates, but many candidates incorrectly used all the gates. • Candidates should attempt to write more in questions where they are asked to state reasons or benefits to demonstrate understanding. For example within syllabus reference 5.24, a two word answer like “minimise figures” is very vague but had the candidate written “minimising figures results in less errors during calculation” or “minimising figures makes manipulation of the values easier” then the candidate has shown understanding. • Candidates should always check to make sure that graph axes are suitably labelled. An example of this is 8.25 where the output axis must indicate a positive, zero and negative condition. This was often omitted and is essential for the written description. • The presentation of graphs and sketches in most cases is good, however this is not consistent. Candidates should ensure they have reasonable drawing equipment and practice their graphical communication skills.