Examination report – June 2014 series

2730-011 Fundamentals of Electronic Communication 2

Section 1 – Areas of good performance
Syllabus reference: 1.14 / 1.15 – Mean and median. Answers were generally very good. Syllabus reference: 1.17 – Modal value on histogram. This part was generally well answered by candidates from most centres. Some candidates were unable to find the modal value from the histogram but majority of histograms were correct. Syllabus reference: 1.9 / 1.10 – Define the octal and hexadecimal number systems and convert binary numbers to octal and hexadecimal forms. Express octal and hexadecimal numbers in binary form. Majority of answers were correct however there is still a tendency for some candidates to omit the calculation method. Syllabus reference: 1.22 – Standard deviation formula symbols. Mainly well answered. Syllabus reference: 2.18 / 2.22 – Karnaugh map. These were generally well drawn by candidates from the majority of centres. Syllabus reference: 2.22 – Logic gates. Majority of answers were correct. Syllabus reference: 3.14 – Transmission systems. Majority of candidates were able to explain the difference between the systems. Unfortunately some of the diagrams did not indicate the correct systems. Some were poorly drawn. Syllabus reference: 3.14 – Serial and parallel transmission systems. This section was reasonably well answered. Syllabus reference: 3.20 – Typical bandwidths. This section was well answered. Syllabus reference: 4.11 / 4.12 – Noise factor and noise figure. This section was well answered in the majority of cases. Syllabus reference: 4.9 – Signal to noise ratio. There were many really good answers to this section, however, some candidates just gave a definition of signal to noise ratio. Syllabus reference: 5.18 – Benefits of suing Logarithmic units. This section was generally well answered however there were still some answers which stated that calculations were ‘easy’ or ‘simple’, without any reasoning. Syllabus reference: 5.24 – System gain calculation. There were many good answers to this section. Syllabus reference: 5.23 – Definition of signal to noise ratio. Many good answers, however some candidates had a problem with the dB conversion.

Syllabus reference: 6.17 – Characteristic impedance.
Many good answers to this section.

Syllabus reference: 7.6 – Impedance and current in a resonant circuit.
Overall the section was reasonably answered.

Syllabus reference: 7.1 / 7.3 – Band stop filter.
Many good answers, however some omitted labelling of the characteristic axes.

Syllabus reference: 7.7 – RLC circuit.
Generally well answered. The main problem resulted from the use of powers in the calculations.

Syllabus reference: 8.8 / 8.12 – Frequency spectrum diagram.
This section was reasonably well answered, the main problem being candidates being unable to differentiate between a frequency spectrum diagram with a single frequency and that with a band of frequencies.

Syllabus reference: 8.2 – Modulation.
Generally very good answers.

Syllabus reference: 8.14 – Amplitude modulated systems.
Well answered in most cases.

Section 2 – Areas for development

Syllabus reference: 1.5 – Binary addition.
This part required use of the 2's compliment method of binary subtraction, using addition. It caused problems for the majority of candidates.

Syllabus reference: 2.18 / 2.22 – Grouping method and logic diagram.
Many candidates were unable to use the grouping method to minimise the expression. Most candidates didn't show how the minimised expression could be used to construct the logic circuit using NOR gates only.

Syllabus reference: 2.10 / 2.11 / 2.27 / 2.28 – Bistable.
Not many correct answers to this section. Most attempted to guess but overall answers were weak.

Syllabus reference: 2.21 – UCLA.
Very few candidates knew an application for this device.

Syllabus reference: 3.2 – DC power supplies.
Few candidates could relate to semiconductor device requirements for their operation in order to answer this section.

Syllabus reference: 3.10 – Distortion due to non-linearity.
Most candidates could not relate to the necessity for electronic devices to operate in a linear region to avoid distortion of the signal as it passes through them. Many candidates gave sources of distortion which was not what was asked.

Syllabus reference: 3.19 – Baseband.
Not many candidates could explain the term baseband.

Syllabus reference: 4.10 – Signal to noise ration calculation.
There was not many correct answers to this section.

Syllabus reference: 5.4 / 5.8 – Logarithms.
Even though there were some perfect answers to this section there were many candidates that struggled to perform the calculations.

Syllabus reference: 5.11 – Natural logarithms.
Many candidates had difficulty with this electronic calculation involving the exponential function.

Syllabus reference: 6.2 – Primary coefficients.
Most candidates could name the coefficients but very few could explain them.

Syllabus reference: 6.5 – Cable characteristics.
Most candidates could sketch the attenuation/frequency characteristic but very few knew the delay/frequency characteristic.

Syllabus reference: 6.20 / 6.21 – Total reflection in a transmission line.
Most answers to this section were incorrect or too brief.

Syllabus reference: 8.19 / 8.25 – Frequency modulated system.
Even though some candidates answered this section totally or in part correct, many candidates answered it incorrectly.

Syllabus reference: 8.24 – FM Radio services.
Not many correct answers to this section. Most candidates omitted the ability to achieve more channels without interference.

Section 3 - Recommendations

Syllabus reference: 6.20 / 6.21
Candidates are advised to revise their transmission line theory as many candidates omitted, or only partially completed, descriptions and waveform diagrams.

General comments
Questions should be read carefully, it must be understood that no marks can be allocated to answers that only state the name of a term and fail to define or describe the term.

Candidates should always check to make sure that graph axes are suitably labelled. An example of this is drawing the standard block symbol and frequency response characteristic indicating the 3dB points, for a Bandstop filter, where the band stop filter axes labelling is essential.

The presentation of graphs and sketches could be improved. Candidates should ensure they have reasonable drawing equipment and practice their graphical communication skills.

Section 4 – Tips

There seemed to be an increase in candidates lack of knowledge of some unit prefixes, milli, micro, nano and pico. A deeper study of these would result in candidates having the answers to calculations correct hence achieving all the marks.
The use of programmable calculators is not allowed in this exam, but candidates should be encouraged to use a scientific calculator.