Examination report – December 2012 series

2730-011 Fundamentals of electronic communication

Section 1 – Areas of good performance
Syllabus reference: 1.22 – Statistics. The majority of answers were very good, with method being shown clearly. However in many cases simple calculation errors were made in the table which lost some marks. Syllabus reference: 1.18, 1.19 – Plot cumulative frequency curve and determine median. This part was generally well answered from most centres. Syllabus reference: 1.1, 1.10 – Number systems. Mainly well answered. Some candidates answered the question using a calculator and correctly listed the calculator keys used. Unfortunately this was not always the case. Syllabus reference: 1.9 – Number systems. Mainly well answered. Syllabus reference: 2.12, 2.24 – Boolean algebra. Many excellent answers. Syllabus reference: 3.10 – Logic diagram. Majority of candidates answered this part really well. Syllabus reference: 3.14 – Relaxation and Sinewave Oscillators. This part was reasonably answered in most cases. Some candidates were only able to give one difference between the two. Syllabus reference: 3.24 – Distortion. Mainly well answered. Syllabus reference: 4.13 – Communication systems. Majority of answers were very good with clear diagrams and descriptions. Syllabus reference: 4.15 – Wire conversion. Many candidates gave more complex diagrams than required with excellent descriptions. Generally this was a very well answered question. Syllabus reference:4.15 – Noise. Majority of answers were very good. Syllabus reference: 5.24 – Thermal Noise Voltage formula. Majority answered this correctly. Many giving a key to the meaning of variable symbols. Syllabus reference: 5.19 – Logarithm calculations. Majority answered this part correctly. Syllabus reference: 6.3 – Decibel Definition. Many good attempts to this part.

Syllabus reference: 7.2 – Attenuation/Frequency Curves.
Relatively well answered, however labelling of axis was omitted in some cases and in others two separate graphs were drawn. Drawing the graphs on a common axes allows a comparison to be seen pictorially.

Syllabus reference: 7.12, 7.7 – Characteristic Impedance.
Many good answers to this section.

Syllabus reference: 8.8 – Parallel LC circuit.
Majority of answers were good. Some had difficulty with prefixes on component values.

Syllabus reference: 8.17 – Dynamic impedance.
Many good answers. Some errors with prefixes on LC values.

Syllabus reference: 8.19, 8.20 – Amplitude Modulation.
This section was reasonably well answered in most cases.

Syllabus reference: 8.20 – Frequency Modulation.
Some very good answers.

Syllabus reference:8.20 – Phase Modulation.
Most candidates answered this question well.

Section 2 – Areas for development

Syllabus reference: 1.5 – Number Systems.
This caused numerous problems. Few candidates could use the complements method to perform the calculation.

Syllabus reference: 2.7, 2.8, 2.18, 2.9 – Logic waveform.
Identifying the logic gate from the waveforms caused problems for many candidates. Even though there were a reasonable amount of correct answers, many candidates struggled with this question. Many thought that the waveforms were from a monostable circuit.

Syllabus reference: 3.1 – Logic diagram using NOR gates.
This caused problems for many candidates due mainly to the inability to use NOR gates to replace a basic gate. Marks were given for the candidates using Boolean algebra to show the NOR gate equivalent, even though a diagram was required.

Syllabus reference: 3.9 – Bistable diagram and truth table.
Many candidates gave the NOR diagram for this part when the NAND diagram was asked for in the question. Truth tables were also drawn for the wrong system in many cases.

Syllabus reference: 3.24 – Conditioning.
Most candidates assumed incorrectly that coding was the answer, but the section asked for an explanation of conditioning.

Syllabus reference: 4.8 – Sources of interference.
Many candidates gave sources of distortion for this part.

Syllabus reference: 5.8 – Noise Calculation.
This part caused many problems. Apart from confusion over which formula to use many candidates incorrectly multiplied a dB value with a ratio.

Syllabus reference: 5.11, 5.21 – Power gain calculation.
Many correct answers to the first part but the second part, which involved the use of the power gain formula in dB, surprisingly caused numerous problems.

Syllabus reference: 6.3 – Current gain calculation.
This part caused problems mainly because the current gain formula was not known.

Syllabus reference: 6.6 – Capacitor charge calculation.
This caused numerous problems due to the fact that the there was lack of knowledge of the exponential function.

Syllabus reference: 6.17 – Primary Coefficients.
This caused problems for some candidates. The fact that the question related to an unloaded cable seemed to be ignored in a lot of cases.

Syllabus reference: 8.12 – High pass filter waveforms.
There were very few correct answers to this part. However the correct answers were very well presented, even showing the effect of variation of the components.

Syllabus reference: 8.16 – R.F. Oscillator.
This caused numerous problems. Some answers though were given as a drawing which was acceptable but not necessary.

Syllabus reference: 8.20 – Amplitude Modulation.
The question asked for an explanation of the process of demodulation but most candidates stated incorrectly the meaning of demodulation.

Section 3 – Recommendations

- Candidates are advised to revise their number systems as many candidates had difficulty with the complements method of subtraction.
- Candidates should revise their logic systems particularly conversion of basic gates into NAND or NOR. More practice is required in the identification of logic gates from waveforms.
- Questions should be read carefully.
- Candidates should always check to make sure those graph axes are suitably labelled. No label means the answer is wrong.
- The presentation of graphs and sketches in most cases was good, however this is not so in all cases. Candidates should ensure they have reasonable drawing equipment and practice their graphical communication skills.

Section 4 – Tips
Some candidates lack of knowledge of unit prefixes, micro, milli , nano and pico is still a problem, A deeper study of these would result in candidates having the correct answers to calculations hence achieving all the marks. There is still a tendency to omit methods of calculation in answers. If a question does not stipulate a method it does not mean that the method used shouldn't be explained. Some candidates that used a calculator listed the calculator keys used, which is a valid response. Unfortunately this was not always the case. Units are often omitted from the answers to calculations and the importance of these should be emphasised.