Examination report – June 2011 series

2730-011 Fundamentals of electronic communication 2

Section 1 – Areas of good performance
Syllabus reference: 1.15, 1.16 – Statistics. Many answers were very good, but methods were sometimes omitted. Syllabus reference: 1.21, 1.22 – Standard Deviation, Binary arithmetic. These parts were generally well answered from most candidates. Syllabus reference: 1.1, 1.9 –Binary arithmetic, number systems. Mainly well answered, the main problem was the conversion of the fractions. Some candidates had difficulty with a decimal number less than 1. Syllabus reference: 2.16, 2.18, 2.23 –Karnaugh Map. Most candidates answered this well. Some drew the Karnaugh map correctly but simplified by Boolean algebra instead of the grouping method asked for in the question. Syllabus reference: 2.9 –Boolean Algebra. Many very good answers. Syllabus reference: 5.3, 5.8 – Logarithms. Most candidates answered this section correctly. Syllabus reference: 4.4, 4.8 –Noise. These sections were answered reasonably well. Syllabus reference: 3.12, 3.14, 3.4, 4.16 – Thermal Noise, Communication Systems Terminology. Most centres answered this question well. Syllabus reference: 3.20, 3.24, 3.25 – 2-4 Wire Conversion, Bandwidths. Generally well answered, most common error for loss of marks was incorrect frequency units for bandwidths, i.e. Hz, kHz, MHz. Syllabus reference: 6.24 – Characteristic Impedance. This section was mostly well answered but some candidates did not verify their answer by referring to the characteristic impedance formula containing the line spacing variable. Syllabus reference: 6.7 – Rise Time, Sag. Many good answers, but still some candidates indicated rise time as the slope and did not refer to the time axis. Syllabus reference: 7.1, 7.2, 7.3 – Filters. Most answered this part well. Syllabus reference: 7.7 –LC Circuit. Many good answers. Syllabus reference: 8.1 – Modulation. Generally well answered. Syllabus reference: 8.19 – Frequency Modulation. Some very good answers.

Section 2 – Areas for development
Syllabus reference: 1.21 – Statistics. Many candidates chose to define the variance and standard deviation using formulas. Marks were lost due to variables/symbols in the formulas not being identified. Syllabus reference: 2.9 – Boolean expression. Some candidates thought this logic circuit was an Exclusive OR even though this is not on the syllabus. Syllabus reference: 2.12, 2.26, 2.28 – Bistable. This caused a lot of problems. Some candidates thought that this was a JK Bistable even though this is not on the syllabus. Many candidates drew a logic circuit instead of a logic symbol. The explanation of bistable operation was related to the circuit drawn by the candidate and not the supplied truth table in the question. Syllabus reference: 5.18 – Logarithmic units. Candidates were very complacent with regard to this question. The question asked for advantages of logarithmic units. Many candidates gave answers such as “easy calculation” and “large numbers made smaller” which are insufficient; more information is required to validate the answer. Syllabus reference: 5.24 – Power gain calculation. The relationship between dB and ratio caused confusion many could not see that the ratio should have decreased when the dB value is negative. Syllabus reference: 4.13 – Signal to Noise. Not many correct answers to this section. In many instances the formula was known but the method of calculation was wrong, this was mainly due to incorrect use of the laws of logarithms. Syllabus reference: 6.2 – Transmission Lines. Many candidates wrongly assumed this question was related to a short circuited length of transmission line and the different waveforms resulting from short circuited connection. Syllabus reference: 7.1, 7.2, 7.3 – Filters. This section caused problems in most cases. The main problem was labelling of the y axis. It is possible to use gain or attenuation on this axis but they must be labelled correctly as the responses are opposite. Both responses were used by different centres but labelling was often incorrect or missing. Not many knew the shape of the output waveform of the high pass filter. Syllabus reference: 8.14 – Single sideband transmission. Most candidates explained the effect of single sideband transmission not the benefits of this type of transmission. Typical answers should have included that as the power is reduced transmission is more efficient. Regarding the bandwidth, using less bandwidth allows more channels to be available. Syllabus reference: 8.6 – Amplitude Modulation. Scaling was an issue with this question; many did not label the axes. Many calculated the correct scale but did not answer the actual question by sketching the waveform.

Section 3 – Recommendations
There are occasions when candidates' answers have not been on the syllabus. Candidates should be fully conversant with the syllabus content prior to sitting the exam. Questions should be read carefully, it must be understood that no marks can be allocated to answers which are in the correct topic area but do not give the required answer. An example is the bistable section in which candidates were asked to draw a logic symbol but many drew a logic circuit. Candidates were asked to use a truth table supplied on the question paper, many used the logic circuit that they had drawn to answer the question. The same problem arose where the benefits of single sideband transmission were asked for. Candidates merely stated that power and bandwidth were reduced without explaining the benefits such as lower cost hence higher efficiency and availability of more channels for a specific bandwidth. Candidates are advised to answer questions thoroughly. Many answers were too brief giving insufficient evidence of understanding. Candidates should always check to make sure that graph axes are suitably labelled. An example of this is where the shape of the filter response is dependent on the label on the y axis. No label means the answer is wrong. This section required indication of the 3dB points, which meant a scale was necessary in particular indication of the 0db level so that the 3dB point is suitably positioned. The presentation of graphs and sketches in most cases is good, however this is not so in all cases. Candidates should ensure they have reasonable drawing equipment and practice their graphical communication skills.