Examination report – June 2014 series

2730-013 Fundamentals of Electronic Communication 3

Section 1 – Areas of good performance
Syllabus reference: 2.2 – Basic operation of fibre optic communication links. Lack in care in reading what was required produced the wrong response to this section. What was called for was the operation of an optical fibre communication system, not the fibre itself. Syllabus reference: 2.3 – Advantages and disadvantages of optical fibre compared to copper transmission lines. There was a lack of explanatory detail in this section. Syllabus reference: 2.5 – Optical fibres. Refraction, in relation to an optical fibre, was only vaguely explained by many candidates. Syllabus reference: 3.12 - Main functions of a modem. In most cases this section needed more detail.
Section 2 – Areas for development
Syllabus reference: 5.27 – Principle of encoding and decoding speech. The blocks in the diagram were identified and the nature of the signal waveform at each of the points in the diagram were stated by candidates having the required knowledge. Syllabus reference: 6.34 – Physical components of the access network. The components Main Distribution Frame (MDF) and primary and secondary connection points of the access network were generally well known. Syllabus reference: 1.1 – Regulation as applied to a d.c. power supply. Few candidates knew what is meant in relation to a d.c. power supply. Many candidates did not read this section carefully. The conversion of a direct voltage to an alternating one using rotating machines requires a d.c. motor mechanically coupled to n a.c. generator. Syllabus reference: 3.4 / 3.5 / 3.6 – Digital data represented. Few candidates read this section carefully. It is in regards to how the three parameters amplitude, frequency and phase varied in each of the forms of modulation given. No candidate realised that when frequency is varied, phase is also always varied and vice-versa. Thus for example in FM, frequency is varied directly by the modulating signal, phase is also varied indirectly and amplitude remains constant. Syllabus reference: 4.3 / 4.4 – Noise. There was a lack of detail in why noise is cumulative and very difficult to eliminate in an analogue system and how in a digital system noise can be eliminated. Syllabus reference: 5.27 - Principle of encoding and decoding speech. Few candidates managed to explain satisfactorily why the blocks in the diagram were not identical. Unit A in in the diagram was a band-pass filter used to restrict the audio band applied to the system. Unit D was a low-pass filter used to effect demodulation of the PAM signal. Syllabus reference: 5.2 – Describe the principles of types of pulse modulation.

Few candidates had little idea of both PWM and PPM. An explanation was required for the fact that reconstruction of the waveform from the spectrum given in the figure provided needed sampling at twice the highest frequency that is at 18kHz. Syllabus reference: 6.14 – How signals are detected by the telephone instrument or exchange equipment in electronic exchange systems. An accurate diagram of a DTMF keypad identifying each of the keys, along with the higher/lower group of frequencies connected to the three columns/four rows was expected. Actual values of frequencies were not required. Syllabus reference: 6.25 – Erlang is a statement of probability of occupation of a circuit. Few candidates knew how to attempt this section. Syllabus reference: 6.21 / 6.24 – Perform calculations using formula and of grades of service. There were wrong answers provided in this section through candidates not paying attention to the units involved (hour and seconds).
Section 3 – General
The vast majority of the candidates were not prepared for this examination. For the majority for whom some preparation was in evidence, marks were not gained because candidates did not read the questions carefully. Candidates failed to give sufficient detail for questions requiring explanations.