Template for CBQ units

Unit	**Telecommunications Principles 2**
SSC Code	TP2
SQA Code	H3BS 04
SCQF Level	7
SCQF Credit Value	10
Guided Learning Hours	
Unit summary	

Learning Outcomes The learner will:	Assessment Criteria
1. Understand the principles of alternating current (AC) circuits	1.1 Explain reactance in circuits 1.2 Explain impedance in terms of resistive and reactive components 1.3 Explain the characteristics of series and parallel resonant circuits 1.4 Calculate the resonant frequency of a circuit

2 Understand the effects of line impairments on a transmitted signal	2.1 Explain the concept of decibel (dB) as a unit of loss
	2.2 Explain the concept of dBm as a unit of power
	2.3 Define the concept of signal-to-noise ratio as applied to transmission lines
	2.3 Calculate using dBs and dBms the
	   • total loss of a system from individual losses
	   • total loss of a system from input and output signal levels
	   • output signal level from total loss and input signal level
	   • signal-to-noise ratios

3 Be able to apply the characteristics of transmission lines	3.1 Demonstrate the importance of the primary line constants in transmission lines 3.2 Explain the effect of the primary line constants R, G, L & C on the characteristic impedance of transmission lines 3.3 Define the concept of angular frequency as applied to transmission lines 3.4 Calculate the characteristic impedance of finite and infinite line lengths using the primary line constants 3.5 Calculate the characteristic impedance of a parallel pair of wires and co-axial cable 3.6 Produce an equivalent circuit model of a

		transmission line in terms of resistance, capacitance and inductance
		3.7 Calculate the bandwidth of a transmission line in terms of frequency between half power points
4	Understand the transmission of digital signals over transmission media	4.1 Demonstrate the representation of binary information and explain the advantages of each type • non-return to zero (NRZ) digital encoding from given values • return to zero (RTZ) digital encoding from given values • bi-phase digital encoding (Manchester) from given values • bi-phase digital encoding (Differential Manchester) from given values 4.2 Explain the concept of bit rate and bit error rate (BER) 4.3 Explain digital signal impairments in terms of delay, jitter and binary errors 4.4 Explain the effects of delay, limited bandwidth and jitter on the extraction of binary information from a digital signal
5	Understand the process of modulating an analogue carrier frequency using digital signals	5.1 Explain digital modulation using analogue frequency carriers including: • shift keying • constellation diagrams • channel capacity calculation 5.2 Explain the need for filters and their effect on digitally modulated signals 5.3 Calculate the Baud rate of given link states using given values
6	Understand multiplexing digital and analogue signals over transmission media	6.1 Explain the concept of • frequency division multiplexing • synchronous time division multiplexing • asynchronous time division multiplexing • digital time division multiplexing • code division multiplexing • Wavelength division multiplexing • coarse wavelength division multiplexing • dense wavelength division multiplexing
Additional information about the unit		
Guidance on approaches to assessment		Further guidance is set out in the CBQ Assessment principles developed by e-skills UK and agreed by the Joint Awarding Body Forum.
Details of the relationship between the unit and relevant National Occupational Standards or other professional		This unit is based on the e-skills UK NOS for IT professionals (PROCOM) available from www.e-skills.com/nos

standards	
Location of the unit within the subject/sector classification system	IT Professional
Name of the organisation submitting the unit	e-skills UK