OCR
Oxford Cambridge and RSA

Unit Title:	**Networking principles**
OCR unit number:	23
Unit reference number:	T/601/3289
Level:	2
Credit value:	6
Guided learning hours:	45

Unit aim

The aim of this unit is that learners will:

- Know the OSI model and the TCP/IP suite

- Know different network topologies and transmission systems

- Know the advantages and disadvantages of different types of network

- Know media access control methods used in local area networks

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills

The Learner will:
1   Know the OSI model and the TCP/IP suite
	The Learner can:
	1.1 Identify the function of the OSI model layers
	1.2 List the TCP/IP protocols
	1.3 List the types of addresses used on networks and why they are used
		- the seven layers of the OSI model and explain their functionality
		- the terminology TCP/IP
		- the four layers and TCP/IP protocols
		- the types of addresses used on networks and why they are used including:
		  - IP
		  - TCP
		  - UDP
		  - FTP
		  - TFTP
		  - SMTP
		  - HTTP
		  - HTTPS
		  - POP3/IMAP4
		  - TELNET
		  - ICMP
		  - ARP
		  - NTP

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills

2 Know different network topologies and transmission systems	2.1 Explain logical network topologies as given in the IEEE802 standards for LANs and WANs
	2.2 Identify the following types of network cabling and connectors:
	• Cat 5 and RJ45
	• Cat 5e and RJ45
	• Cat 6 and RJ45
	• thin co-axial and BNC connector
	• thick co-axial, and AUI transducer with patch cable
	• fibre optic cables and connectors
	2.3 Describe the different types of wireless LAN
	2.4 Describe the function of the following network devices:
	• interface controller
	• repeater
	• passive, active and intelligent hubs
	• bridge
	• switch router
	• gateway
	2.5 Explain the 5-4-3 rule of network design
		• the IEEE 802 standards and the layers of the OSI model they are associated with
		• the network topologies for which the standards are used
		• the different types of network cabling, including connectors and terminology
		• the concept of the cable naming convention
		• the different types of wireless LAN systems and when they would be used
		• the types and functionality of a range of network devices including:
		  - network interface controller
		  - repeater
		  - passive, active and intelligent hubs
		  - bridge
		  - switch router
		  - gateway
		• the 5-4-3 rule and explain the limitations of its use

3 Know the advantages and disadvantages of different types of network	3.1 List the properties, security and sharing advantages and disadvantages of:
	• peer to peer networks
	• client server networks
	3.2 List the uses and limitations of a null modem connection
		• issues relating to security and file sharing for networks:
		  - null modem connections and
		  - be able to identify the different types of null modem, uses and limitations

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills

4 Know media access control methods used in local area networks	4.1 List the types of media access control methods used in LANs
	4.2 Explain what is meant by a collision and how network systems deal with them
	4.3 Explain the difference between a Token bus and a Token ring and how the token operates in each
	4.4 Explain the line encoding used in CSMA/CD and CSMA/CA networks
	4.5 Identify the limitations of CSMA/CA
		• media access control methods used in LANs including:
		  - CSMA/CD
		  - Token Ring
		  - CSMA/CA
		• token bus systems their uses and operations
		• collisions and how they are addressed by network systems
		• the specifics of line encoding used in CSMA/CD and CSMA/CA networks, associated problems including polling

Assessment

The qualification has been designed to develop knowledge, understanding and skills in the full range of functions involved in the planning and control, hardware, software and systems installation, software solutions and the production of customer support materials. It also provides opportunities for learners to study towards system and network management, to specialise in one or more specific programming languages in addition to being able to take units that are vendor specific.

Each unit within the specification is designed around the principle that candidates will build a portfolio of evidence relating to progression towards meeting the unit assessment objectives.

The unit assessment objectives reflect the demands of the learning outcomes for each unit.

In order for candidates to be able to effectively progress towards meeting the requirements of each assessment objective, tutors must make sure that the supporting knowledge, understanding and skills requirements for each objective are fully addressed. The identified knowledge, understanding and skills are not exhaustive and may be expanded upon or tailored to particular contexts to which the unit is being taught and the assessment objective applied.

We recommend that teaching and development of subject content and associated skills be referenced to real vocational situations, through the utilisation of appropriate industrial contact, vocationally experienced delivery personnel, and real life case studies.

All the learning outcomes and assessment criteria must be clearly evidenced in the submitted work, which is externally moderated by OCR.

Results will be Pass or Fail.

Guidance on assessment

Candidates do not have to achieve units in any particular order and tutors should tailor learning programmes to meet individual candidate needs. It is recommended that, wherever possible, centres adopt a holistic approach to the delivery of the qualification and identify opportunities to link the units.

Centres are free to deliver this qualification using any mode of delivery that meets the needs of their candidates. Whatever mode of delivery is used, centres must ensure that learners have appropriate access to appropriate resources and consider the candidates' complete learning experience when designing learning programmes. This is particularly important in relation to candidates studying part time alongside real work commitments where candidates may bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors.

It is difficult to give a detailed answer to how much evidence is required as it depends on the type of evidence collected and the judgement of assessors. The main principles, however, are as follows: for a candidate to be judged competent in a unit, the evidence presented must satisfy:

- all the items listed, in the section 'Learning Outcomes'

- all the areas in the section 'Assessment Criteria'

Questioning the candidate is normally an ongoing part of the assessment process, and is necessary to:

- test a candidate's knowledge of facts and procedures

- check if a candidate understands principles and theories *and*

- collect information on the type and purpose of the processes a candidate has gone through

- candidate responses must be recorded

The quality and breadth of evidence provided should determine whether an assessor is confident that a candidate is competent or not. Assessors must be convinced that candidates working on their own can work independently to the required standard.

Additional information

For further information regarding administration for this qualification, please refer to the OCR document *'Admin Guide: Vocational Qualifications'* on the OCR website www.ocr.org.uk .