Unit Title:	**Technical Fault Diagnosis**
OCR unit number	28
Level:	3
Credit value:	12
Guided learning hours:	75
Unit reference number:	A/601/3293

Candidates undertaking this unit must complete real work activities in a work environment. Simulation is only allowed in exceptional circumstances (please refer to the centre handbook for further details).

Unit purpose and aim

This unit develops a detailed understanding of the process, methods and information that are used in the diagnostic process and their practical application in the diagnosis to a range of faults. It also covers selection of remedies for identified faults and maintenance of relevant records.

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills
The Learner will: 1 Understand the processes, methods and information that are used in the diagnostic process	**The Learner can:** 1.1 Describe the steps of the diagnostic process including: • fault validation • information gathering • information analysis • solution identification 1.2 Describe the types of diagnostic information that are commonly needed: • problem description • problem history • problem location • technical Information on a specified range of products including the system under investigation 1.3 Explain the following diagnostic methods and give examples of their appropriate use: • substitution • replication • performance and functional testing • environment change 1.4 Explain how the following	Candidates must have an understanding of: • the sequence of actions to be systematically followed when carrying out fault diagnosis where there are a wide range of causes or this is a new or unfamiliar fault. This includes the methods and tools used, the information that is to be recorded and the systems used for recording the information. • the importance of fault validation, information gathering, information analysis and solution identification. • the use of a wide range of diagnostic methods and tools including: substitution, replications, performance and functional testing and environment change. • a range of considerations affecting fault diagnosis and how they can be addressed. • the types of information

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills
	considerations can affect fault diagnosis: • minimisation of service disruption during diagnostics • individual responsibility and authority • escalation procedure • service level agreements 1.5 Interpret detailed technical information on a range of products	related to the problem being diagnosed and the process of using the information. They should also be able to describe when the information would be required including; resource allocation, trend analysis, financial • how to interpret a broad range of technical information for a wide variety of products.
2 Be able to diagnose faults with a wide range of causes.	2.1 Select and correctly use appropriate diagnostic tools to carry out non-routine diagnosis. 2.2 Select and use given sources of diagnostic and other technical information 2.3 Identify and interpret the relevant information to support the diagnosis 2.4 Analyse information to diagnose faults with a wide range of causes, using at least three of the following approaches • trend analysis • what-if scenarios • gap analysis • identification of cause and effect • flow charts 2.5 Describe possible ways to prevent reoccurrence of diagnosed faults	Candidates must have an understanding of: • a wide range of diagnostic tools eg: electrical/electronic test instruments; on-board self-test programs; loop-back devices; on-line/remote monitoring software; diagnostic software, appropriate to the particular fault. • a wide range of sources of diagnostic and technical information including: taking measurements; observing and recording system performance; interviewing relevant personnel, obtaining technical specifications and fault history, product technical specifications and troubleshooting information. • how to validate and accurately record information to support the diagnosis. • how to select and use a logical systematic approach to identify the root cause of faults from gathered information. • of ways of preventing reoccurrences of identified faults.

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills
3 Select remedies for non routine faults	3.1 Select a suitable remedy to rectify identified faults taking into account the following: • business or service impact • resource and skill availability • ease of implementation • cost effectiveness • performance • compatibility • time • permanence 3.2 Identify possible ways to prevent reoccurrence of diagnosed faults	Candidates must be able to select appropriate and relevant remedies taking into account a range of factors. Candidates must have a detail understanding of different ways of preventing reoccurrences of identified faults.
4 Maintain diagnosis and remedy records	4.1 Accurately document the diagnosis activities undertaken including: • fault description • supporting information • diagnostic tools etc used • cause of fault • remedy selected	Candidates must have a detailed understanding of the requirements for documenting diagnosis activities.

Assessment

Candidates undertaking this unit must complete real work activities in order to produce evidence to demonstrate they are occupationally competent. Real work is where the candidate is engaged in activities that contribute to the aims of the organisation by whom they are employed, for example in paid employment or working in a voluntary capacity.

Simulation is only allowed for aspects of units when a candidate is required to complete a work activity that does not occur on a regular basis and therefore opportunities to complete a particular work activity do not easily arise. When simulation is used, assessors must be confident that the simulation replicates the workplace to such an extent that candidates will be able to fully transfer their occupational competence to the workplace and real situations.

Internal quality assurance personnel must agree the use of simulated activities before they take place and must sample all evidence produced through simulated activities.

It is the assessor's role to satisfy themselves that evidence is available for all performance, knowledge and evidence requirements before they can decide that a candidate has finished a unit. Where performance and knowledge requirements allow evidence to be generated by other methods, for example by questioning the candidate, assessors must be satisfied that the candidate will be competent under these conditions or in these types of situations in the workplace in the future. Evidence of questions must include a written account of the question and the candidate's response. Observations and/or witness testimonies must be detailed and put the evidence into context ie the purpose of the work etc.

All of the assessment criteria in the unit must be achieved and clearly evidenced in the submitted work, which is externally assessed by OCR.

Evidence for the knowledge must be explicitly presented and not implied through other forms of evidence.

Evidence requirements

All aspects of the assessment criteria must be covered and evidence must be available that shows where and how the assessment criteria have been achieved.

Assessment Criterion 1

They must describe the relevant parts of the diagnostic process as they relate to a complex or unfamiliar fault, which should include:

Gathering and interpreting a range of technical information from a wide range of sources relevant to their fault diagnosis activities.

- a range of diagnostic methods including examples of use.

- explain what these methods are and why they were appropriate.

- the importance of adhering to considerations which affect the fault diagnosis

- technical information on a specified range of products including the system under investigation

Assessment Criterion 2

Through a range of complex activities, candidates must provide evidence of:

- selecting, reviewing and adapting appropriate diagnostic tools to carry out non-routine diagnosis.

- they must describe the sources of diagnostic and other technical information used.

- they must provide evidence of the relevant approved information to support diagnosis and explain how they validated and what it was used for.

- diagnosing faults which have a wide range of causes by analysing the information gathered.

- the evidence must include the use of common approaches.

- they also need to describe how reoccurrence of the faults can be prevented.

Assessment Criterion 3

Candidates must provide evidence of selecting appropriate remedies for at least 3 non-routine faults, and identify ways of preventing re-occurrence.

Assessment Criterion 4

Candidates must provide documentary evidence to support the 3 diagnosis' activities.

Candidates are encouraged to choose activities which will allow them to cover all or a majority of the criteria at one time. It is not necessary to use different activities for each element of the criterion.

Guidance on assessment and evidence requirements

Evidence can reflect how the candidate carried out the process or it can be the product of a candidate's work or a product relating to the candidate's competence.

For example: The process that the candidate carries out could be recorded in a detailed personal statement or witness testimony. It is the assessor's responsibility to make sure that the evidence a candidate submits for assessment meets the requirements of the unit.

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

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'

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*' *(A850)* on the OCR website www.ocr.org.uk .