



Unit Title:	Technical Fault Diagnosis
OCR unit number	27
Level:	2
Credit value:	9
Guided learning hours:	45
Unit reference number:	T/601/3292

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 introduces knowledge of the process, methods and information that are used in the diagnostic process and their practical application in the diagnosis of a limited 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
<p>The Learner will:</p> <p>1 Know the process, methods and information that are used in the diagnostic process</p>	<p>The Learner can:</p> <p>1.1 Identify the steps of the diagnostic process including:</p> <ul style="list-style-type: none"> • fault validation • information gathering • information analysis • solution identification <p>1.2 Describe the types of diagnostic information that are commonly needed and their purpose</p> <p>1.3 Describe common diagnostic methods to include:</p> <ul style="list-style-type: none"> • substitution • replication • performance and functional testing • environmental change <p>1.4 List typical considerations affecting fault diagnosis, eg:</p> <ul style="list-style-type: none"> • minimisation of service disruption during diagnostics • individual responsibility and authority • escalation procedure • level of service 	<p>Candidates must have an understanding of:</p> <ul style="list-style-type: none"> • how to diagnose faults with a known range of causes and assist in the diagnosis of other faults, outside of their experience • the sequence of actions that must be followed to systematically carry out fault diagnosis. This should include the methods and tools to be used, information to be recorded and recording systems • why diagnostic information is required eg accurate fault diagnosis, correct fault rectification and prevention of new or recurrent occurrences • the type of diagnostic information required eg problem description, problem history, problem location, problem specifications, time and expense records, any part used, actions taken and outcome

Learning Outcomes	Assessment Criteria	Knowledge, understanding and skills
<p>2 Apply processes to diagnose faults with a known range of causes and assist in the diagnosis of other faults</p>	<p>2.1 Correctly use appropriate diagnostic tools eg:</p> <ul style="list-style-type: none"> • electric/electronic test instruments • on-board self-test programs • loopback devices • on-line/remote monitoring • diagnostic software <p>2.2 Effectively use given sources of information to support diagnosis</p> <p>2.3 Analyse information to identify the cause of faults, using two of the following approaches:</p> <ul style="list-style-type: none"> • gap analysis • identification of cause and effect • flow charts 	<p>Candidates must have an understanding of:</p> <ul style="list-style-type: none"> • a variety of diagnostic tools • how to follow a sequence of actions in order to systematically carry out or assist in the diagnosis of faults. The must be able to identify, validate and record relevant sources of information including: <ul style="list-style-type: none"> - taking measurements - observing and recording system performance - interviewing relevant persons - obtaining technical specifications - fault history • how to use relevant information to identify the root cause of the problem and select appropriate ways to prevent reoccurrence
<p>3 Select fault remedies from given alternatives</p>	<p>3.1 Select, from given alternatives, a suitable remedy to rectify identified faults taking into account the following:</p> <ul style="list-style-type: none"> • business or service impact • resource and skill availability • ease of implementation <p>3.2 Identify possible ways to prevent reoccurrence of diagnosed faults</p>	<p>Candidates must have an understanding of:</p> <ul style="list-style-type: none"> • a range of remedies for rectifying faults including where to locate information if not readily available • ways to prevent the reoccurrence of faults
<p>4 Maintain diagnosis and remedy records</p>	<p>4.1 Accurately document the diagnosis activities undertaken including:</p> <ul style="list-style-type: none"> • fault description • supporting information • diagnostic tools used etc • cause of fault • remedy selection 	<p>Candidates must have an understanding of the records and procedures for documenting fault diagnosis activities.</p>

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

Candidates must describe:

The different aspects of the diagnosis process including:

- fault validation
- information gathering
- information analysis
- solution identification

The diagnostic information that is commonly needed and the purposes for which it is required to include fault diagnosis, fault rectification and prevention

Typical considerations which can affect fault diagnosis to include:

- how to minimise service disruption during diagnostics
- individual responsibility and authority
- escalation procedure

- level of service

The different diagnostic methods to include:

- substitution
- replication
- performance and functional testing
- environment change

Assessment Criterion 2

Through a range of activities, candidates must provide evidence of diagnosing routine faults and assisting in the diagnosis of more complex faults outside of their experience.

The evidence must include:

- the description of the fault(s)
- validation of the fault
- appropriate use of relevant diagnostic tools including evidence of usage and results
- validation and analysis of results
- identification of sources used to support diagnosis
- identification of cause of fault(s) and which approach was used
- identification of ways to rectify the fault(s) and prevent reoccurrence of fault(s)
- identification of the point at which they escalated the problem to a senior or more experienced colleague, if appropriate

Assessment Criterion 3

Candidates must provide evidence of:

- selecting appropriate remedies for at least three different faults justifying their choices.
- identifying how to prevent the reoccurrence of each of the faults

Assessment Criterion 4

Evidence should include the completed recording documents from the three fault 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 .