

Unit 15: System testing and maintenance (LEVEL 2)

Learning outcomes

After completing this unit candidates will be able to carry out preventative and remedial maintenance.

Candidates will be able to:

- identify and explain the need for preventative and routine maintenance
- explain the need for routine tests and testing, and understand common types of problem
- identify the actions and resources required to address typical problems
- identify the range of different types of system tests and use three typical tests
- analyse test results for the three tests carried out and report findings
- investigate system discrepancies found as a result of testing and identify action to be taken
- understand common types of system problem.

It is anticipated that a candidate will require 60 guided learning hours to complete this unit.

Assessment objectives	Knowledge, understanding and skills
1 Identify and explain the need for preventative and routine maintenance	<p>Preventative maintenance:</p> <ul style="list-style-type: none"> • at regular periods • the purpose of maintenance task(s) • the health and safety rules to follow • the need to maintain accurate records • the correct use of equipment <p>Show an awareness of the:</p> <ul style="list-style-type: none"> • importance of electrostatic discharge • dangers of lasers found in equipment components • toxicity of laser toner • hazards associated with solvents used in cleaning • high voltages in CRT monitors • disposal of solvent cans, batteries and toner cartridges <p>Routine maintenance tasks including:</p> <ul style="list-style-type: none"> • cleaning keyboard, floppy drive, motherboard, mouse and monitor screen • checking cabling • testing CD drive
2 Explain the need for routine tests and testing, and understand common types of problem	<p>Routine tests including:</p> <ul style="list-style-type: none"> • the need to monitor and record system performance • errors arising during routine testing • problems arising for users from problems with the applications, network or system • failure of a hardware component effecting an application • the use of accurate record keeping for applications and systems

(continued)

Assessment objectives	Knowledge, understanding and skills
<p>2 Cont.</p> <p>Explain the need for routine tests and testing, and understand common types of problem</p>	<ul style="list-style-type: none"> • impact of removing applications upon the system software • the levels of test within a computer system ranging from the BIOS POST through the operating system to the application and network links • the use of elimination to identify sources of errors
<p>3 Identify the actions and resources required to address typical problems</p>	<p>The need to adopt a systematic approach to planning action including help from the following sources:</p> <ul style="list-style-type: none"> • knowledge from within the organisation(s) • equipment required for testing • the manufacturer's web site or technical support • newsgroups <p>The need to escalate the problem to supervisors</p> <p>Planned approach to particular problems including:</p> <ul style="list-style-type: none"> • means of identifying the source of the problem • alternative sources of problem • which test(s) to apply • possible remedies • evidence of consultation where necessary
<p>4 Identify the range of different types of system tests and use three typical tests</p>	<p>Documentation, such as a performance log, describing suitable tests carried out with a variety of applications such as:</p> <ul style="list-style-type: none"> • opening application successfully, identifying reasons for not loading and selecting action to take • entering data, saving work and reloading by taking use of standard operations for the organisation • the use of valid test data, invalid and boundary test data • using features without application 'locking up' • testing components within application load and work effectively • closing application • self-test facilities within an application • running anti-virus scanning to prevent virus causing problems <p>Checking registry entries and use of software tools and implications of working on the registry</p> <p>The use of testing to maintain security</p>
<p>5 Analyse test results for the three tests carried out and report findings</p>	<p>Evidence of hardware testing including:</p> <ul style="list-style-type: none"> • error reports on booting and the use of reference sources to identify fault(s) on booting BIOS • memory and CPU testing as part of BIOS and utility testing • operating system loads successfully and the facility to disable a hardware device to isolate fault • error messages that can appear as the Operating System loads and how to deal with them • sound card/audio faults • monitor/video tests • testing various drives • disc de-fragmentation and the reasons for this operation • use of system monitors with mention of factors effecting CPU

(continued)

Assessment objectives	Knowledge, understanding and skills
<p>5 Cont.</p> <p>Analyse test results for the three tests carried out and report findings</p>	<ul style="list-style-type: none"> usage, network traffic, motherboard monitoring and setting of alarm conditions configuration of peripheral(s) used by application and testing reporting of test results
<p>6 Investigate system discrepancies found as a result of testing and identify action to be taken</p>	<p>Candidates will provide evidence of a log showing results from testing over a period of time and when making changes to a computer system:</p> <ul style="list-style-type: none"> carrying out a disc scan and de-fragmentation giving reasons for the regular need for the operation scanning for virus and removal stating when necessary and why there is a need to use latest dictionary record showing application using valid, invalid and boundary data considering the output reports from diagnostic software testing whether the tests indicate the need for hardware changes such as the fitting of more RAM <p>Describe how:</p> <ul style="list-style-type: none"> plans evolved to solve major problems targets were set to evaluate the solutions to problems resources were identified (human, information and equipment)
<p>7 Understand common types of system problem</p>	<p>Common types of problem (including):</p> <ul style="list-style-type: none"> power supply voltage faults BIOS errors RAM faults hard disc failure and problems CD ROM misreads floppy disc errors keyboard faults mouse problems application crashes operating system failure crashes after hardware or software upgrades printer consumable problems printer failure other peripheral problems <p>Documentation will show the:</p> <ul style="list-style-type: none"> means of identification of these faults regular use of diagnostic tools the effect of faults upon the operation of installed applications how to resolve problems

Assessment

This unit is centre assessed and externally moderated.

In order to achieve this unit, candidates must produce a portfolio of evidence showing that they have met all of the assessment objectives.

Portfolios of work must be produced independently. They will need to be made available, together with witness statements and any other supporting documentation, to the OCR Visiting Moderator when required.

Centres must confirm to OCR that the evidence produced by candidates is authentic. An OCR Centre Authentication Form is provided in the Centre Handbook and includes a declaration for assessors to sign. It is a requirement of the QCA Common Criteria for all Qualifications that proof of authentication is received.

Guidance on assessment and evidence requirements

This is a practical unit where candidates will need time and the necessary hardware and software to practice the skills and techniques listed. The software utilised for the delivery of this unit should be that which is commonly found in a business setting.

For Assessment Objective 1 candidates must identify and explain the need for preventative and routine maintenance. The explanation of preventative maintenance would include the purpose of maintenance task(s), the need for maintenance at regular periods, health and safety rules to follow, correct use of equipment and the need to maintain accurate records. Candidates must show an awareness of the importance of electrostatic discharge, dangers of lasers found in equipment components, toxicity of laser toner, hazards associated with solvents used in cleaning, high voltages in CRT monitors, disposal of solvent cans, batteries and toner cartridges. Routine maintenance tasks could include cleaning keyboards, floppy drives, motherboards, mice and monitor screens, testing CD/DVD drives and checking cabling.

For Assessment Objective 2 candidates will need to explain the need for routine tests and testing, and demonstrate an understanding of common types of problem. Routine testing would include the need to monitor and record system performance; noting errors arising during routine testing; identifying problems arising for users from problems with the applications, network or system; failure of a hardware component affecting an application; using accurate record keeping for applications and systems and investigating the impact of removing applications upon the system software. Candidates should also investigate the levels of test within a computer system, this may range from the BIOS POST through the operating system to the application and network links and the use of elimination to identify sources of errors.

For Assessment Objective 3 candidates must identify the actions and resources required to address typical problems. They will need to investigate the need to adopt a systematic approach to planning action including help from some of the following sources: knowledge from within the organisation(s), equipment required for testing, manufacturer's web site or technical support, newsgroups. They will need to report on the need to refer the problem to supervisors. They should adopt a planned approach to particular problems including the means of identifying the source of the problem, alternative sources of problem, which test(s) to apply, possible remedies and evidence of consultation where necessary.

For Assessment Objective 4 candidates will need to identify the range of different types of system tests and use **three** typical tests. They will need to provide documentation, such as a performance log, describing suitable tests carried out with a variety of applications, for example opening application(s) successfully; identifying reasons for not loading and selecting the action to take; entering data, saving work and reloading by taking use of standard operations for the organisation; using valid test data, invalid and boundary test data; using features without application 'locking up'; testing components within application load and work effectively; closing an application; using self-test facilities within an application and running anti-virus scanning to prevent virus causing problems. Candidates should check registry entries and use of software tools and implications of working on the registry.

For Assessment Objective 5 candidates will need to analyse test results for the three tests carried out and report findings. They should provide evidence of hardware testing including error reports on booting and the use of reference sources to identify fault(s) on booting the BIOS; memory and

CPU testing as part of BIOS and utility testing. They should check that the operating system loads successfully and identify the facility to disable a hardware device to isolate a fault. They should describe or provide evidence of error messages that can appear during operating system loading and how to deal with these error messages. They should test sound cards and check for audio faults; carry out monitor and video tests, test various drives; carry out disk defragmentation and report on the reasons for this operation. They should report on the use of system monitors and the factors affecting CPU usage, network traffic, motherboard monitoring, setting of alarm conditions and configuration of peripheral(s) used by application and testing.

For Assessment Objective 6 candidates should investigate system discrepancies found as a result of testing and identify action to be taken. Candidates should provide a log showing results from testing over a period of time and when making changes to a computer system. This log should show evidence of carrying out a disk scan and defragmentation and should include reasons for the regular need for this operation. The log should show evidence of scanning for viruses and removal, and should state when this is necessary and why there is a need to use the latest virus dictionary. Candidates should consider the output reports from diagnostic software testing and whether the tests indicate the need for hardware changes such as fitting more RAM. Candidates must describe how plans are evolved to solve major problems, how targets were set to evaluate the solutions to the problems and how resources were identified (human, information and equipment).

For Assessment Objective 7 candidates should demonstrate an understanding of common types of system problem including power supply voltage faults, BIOS errors, RAM faults, hard disc failure and problems, CD Rom misreads, floppy disk errors, keyboard faults, mouse problems, application crashes, operating system failure, crashes after hardware or software upgrades, printer consumable problems, printer failure and other peripheral problems. Documentation should show the means of identification of these faults, regular use of diagnostic tools, the effect of faults upon the operation of installed applications and how to resolve problems.

Candidates may provide portfolio evidence for the assessment objectives of this unit using a range of presentation techniques. These may include written data, the use of video, audio or computer based presentation, and assessor testimony/witness statements (if appropriate). Where candidates demonstrate competence, centres should record skills demonstrated on appropriate recording documentation.

Signposting to Key Skills

- ✓ The unit contains opportunities for developing the Key Skill, and possibly for generating portfolio evidence, if teaching and learning is focused on that aim.

Key Skill reference		Key Skill reference		Key Skill reference	
C2.1a		ICT2.1	✓	N2.1	
C2.1b		ICT2.2	✓	N2.2	
C2.2	✓	ICT2.3	✓	N2.3	
C2.3	✓				

Mapping to National Occupational Standards

National Occupational Standards	Reference ID	Title
IT Professional (e-skills UK)		Testing ICT Systems Level 2

Resources

This section provides suggestions of suitable resources. The list is neither prescriptive nor exhaustive, and candidates should be encouraged to gather information from a variety of sources.

Some suggested resources are intended for Tutor use. The resources in this section were correct at the time of production.

Books

Gookin, D.	<i>Troubleshooting your PC for Dummies</i>
Minasi, M.	<i>The Complete PC Upgrade and Maintenance Guide</i>
Que Development Group	<i>Get More Out of Your PC and Add-ons</i>
Meyers, M.	<i>Mike Myers A+ Guide to Managing and Troubleshooting PCs</i>

Websites

The following sites provide performance testing software – some include free trial downloads:

[URL:http://www.pctools.com/](http://www.pctools.com/)

A site providing essential tools for your PC.

[URL:http://www.jaggedonline.com](http://www.jaggedonline.com)

[URL:http://www.futuremark.com](http://www.futuremark.com)

Handheld device performance information and services.

[URL:http://www.eurosoft-uk.com](http://www.eurosoft-uk.com)

System software information.

Disk drive Manufacturers often provide facilities for disk testing, for example:

[URL:www.maxtor.com](http://www.maxtor.com)

Information on hard disk drive storage products and solutions.

[URL:www.fujitsu.com](http://www.fujitsu.com)

[URL:www.wdc.com](http://www.wdc.com)

Provides cost-effective storage solutions for people/organisations that collect, manage and use digital information.

[URL:www.hitachi.com](http://www.hitachi.com)

[URL:www.ibm.com](http://www.ibm.com)

Grading

Assessment Objective	Pass	Merit	Distinction
AO1 Identify and explain the need for preventative and routine maintenance	Candidates will provide a basic explanation for preventative and routine maintenance. They will show some awareness of potential dangers when carrying out maintenance tasks.	Candidates will provide a sound explanation for preventative and routine maintenance. They will show an awareness of potential dangers when carrying out maintenance tasks and outline details of preventative as well as routine maintenance.	Candidates will provide a detailed explanation for preventative and routine maintenance. They will show an awareness of a range of potential dangers when carrying out maintenance tasks and provide details of preventative as well as routine maintenance.
AO2 Explain the need for routine tests and testing, and understand common types of problem	Candidates will provide a brief explanation for the need to carry out routine tests. They will identify at least one common problem.	Candidates will provide a detailed explanation for the need to carry out routine tests. They will identify a few common problems.	Candidates will provide a thorough explanation for the need to carry out routine tests. They will identify a range of common problems.
AO3 Identify the actions and resources required to address typical problems	Candidates will produce a basic plan for resolving typical problems. The plan will include sources of help: expert knowledge, testing equipment, technical support from website and tests to carry out.	Candidates will produce a detailed plan for resolving typical problems and the resources required. The plan will include sources of help: expert knowledge, testing equipment/kit, technical support from website and steps taken to resolve the problems: identification of potential sources of the problem, tests to apply and at least one solution.	Candidates will produce a detailed and mostly workable plan for resolving typical problems and the resources required. The plan will include sources of help: expert knowledge, testing equipment/kit, technical support from website and steps taken to resolve the problems: identification of potential sources of the problem, tests to apply and at least one workable solution.
AO4 Identify the range of different types of system tests and use three typical tests	Candidates will document at least three typical system tests they have carried out. Their document will give a basic description of the tests carried out, the purpose of each test and the results.	Candidates will document at least three typical system tests they have carried out. The document will describe in detail suitable tests carried out, the purpose of each test and the results.	Candidates will document at least three typical system tests they have carried out. The document will describe in detail suitable tests carried out, the purpose of each test and the results. There will be some evidence of checking of registry entries and an explanation of the implications of working on the registry.

Assessment Objective	Pass	Merit	Distinction
A05 Analyse test results for the three tests carried out and report findings	Candidates will need to carry out a basic analysis of the test results from the three tests they have carried out.	Candidates will need to carry out a sound analysis of the test results from the three tests they have carried out and include evidence of hardware testing.	Candidates will need to carry out a detailed analysis of the test results from the three tests they have carried out and include evidence of a range of hardware testing.
A06 Investigate system discrepancies found as a result of testing and identify action to be taken	Candidates will provide a log showing results from the tests they have carried out on a system over a period of time. At least one action point will be identified.	Candidates will provide a log showing results from the tests they have carried out on a system over a period of time. Action points will be identified and a plan of action for solving these problems will be produced.	Candidates will provide a log showing results from the tests they have carried out on a system over a period of time. A range of action points will be identified and a comprehensive plan of action for solving these problems will be produced.
A07 Understand common types of system problem	Candidates will identify some common types of system problems and provide brief explanations for each; not all explanations will be accurate.	Candidates will identify a range of common types of system problems and provide mostly accurate explanations for each.	Candidates will identify a comprehensive range of common types of system problems and their explanations will be detailed and mostly accurate.