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Rationale
This unit concerns the technology of personal computers

Learning outcomes
There are four performance outcomes for this unit. The candidate can demonstrate an understanding of:

- basic PC systems
- basic input/output devices
- data storage modules
- current printers.

Assessment and grading
Assessment will be by means of a set assignment covering both practical activities and underpinning knowledge.
Unit 426  
**PC technology**

Outcome 1  
Demonstrate an understanding of a basic PC system and apply this knowledge safely in a practical situation

**Practical activities**
The candidate will be able to:
1. test computer cables
2. install and commission a working stand-alone PC
3. carry out field service procedures for a system desktop/tower unit

**Underpinning knowledge**
The candidate will be able to:
1. identify aspects of personal computer developments and can
   a. review early PCs and IBM developments
   b. describe modular expansion provision
   c. state the role of DOS
2. identify microcomputer systems and can
   a. recognise a microcomputer system block diagram consisting of
      i. system desktop/tower unit
      ii. monitor
      iii. keyboard
      iv. input and output peripherals
   b. state the function of system software
      i. BIOS
      ii. operating systems including Windows
   c. operate in the Windows environment
   d. describe serial and parallel data paths
3. identify the system desktop/tower unit and can
   a. identify the composition of the system board
      i. microprocessor
      ii. memory
      iii. video slot/card
      iv. sound card
      v. I/O card
      vi. FDD and CD controllers
      vii. serial and parallel interfaces
b state power supply voltages and currents

c describe the function of the microprocessor
   i basic specification
   ii speed of operation

d define data and address bus widths
   i byte as 8 bits
   ii word as defined for a given system

4 identify forms of memory and can
   a describe the function of RAM
   b define cache memory
   c define ROM
   d state the function of floppy disk and hard disk
   e define back-up

5 identify serial and parallel I/O and can
   a distinguish between the following
      i RS232
      ii RS423
      iii Centronics
   b recognise serial and parallel cables for use in current PC systems
      i ribbon
      ii twisted
      iii screened
      iv connector types used in current PC systems
      v methods of marking and coding
      vi voltage limitations of cables
   c describe procedures for cable testing
      i continuity
      ii substitution
      iii automatic cable testing

6 identify installation and commissioning requirements for a stand alone (working) PC system comprising system processor unit, monitor, keyboard and mouse and can
   a describe procedures for
      i unpacking and preparation for use
      ii removal of transit packing
      iii removal of shipping packing from moving parts
      iv choosing a place for the system processor unit
      v making connections
      vi repacking the system processor unit for transportation
b describe the initial processes
   i boot-up
   ii power on self test (POST)
c describe procedures for virus checking and clearing
d define the ‘Plug and play’ concept

7 identify flowcharts as an aid to diagnostics and can
   a list flowchart symbols
      i start
      ii finish
      iii action rectangle
      iv decision box
   b construct a simple diagnostic chart

8 identify field service procedures for a system processor unit and can
   a state electro-static precautions to be observed when opening-up units
   b state ac mains safety precautions
   c initiate software diagnostic checks using built in software
   d describe procedures for fault location and module replacement

9 identify procedures and practices for moving and storing loads in workshop and field servicing and can
   a define a load
   b describe hazards associated with moving loads
      i back injury
      ii injury to hands and feet
   c define the centre of gravity of a load
   d explain the use of gloves
   e describe the effect of load surface on grip
   f explain the need to avoid injury to other people when moving a load
   g describe how to minimise lifting
      i plan the move
      ii clear obstacles away
      iii use the most appropriate method
      iv adopt correct posture when lifting
   h describe techniques for stable stacking of goods.
Unit 426 PC Technology

Outcome 2 Demonstrate an understanding of basic input/output device and apply this knowledge safely in a practical situation

**Practical activities**
The candidate will be able to:
1. install, test and clean a computer keyboard
2. install, test and clean a computer mouse
3. carry out routine maintenance and field service procedures on a monitor

**Underpinning knowledge**
The candidate will be able to:
1. identify the computer keyboard and can
   a. describe the keyboard layout
   b. state that pointing devices may be incorporated
   c. state that each keystroke generates a unique code
   d. recognise a keyboard cable
   e. describe substitution test procedures for a keyboard
   f. describe keyboard cleaning procedures
2. identify the computer mouse and can
   a. describe how vertical and horizontal movements are digitised
   b. recognise the mouse cable
   c. describe procedures for mouse driver installation
   d. describe test procedures for a mouse
      i. vertical and horizontal operation with and without the ball
      ii. testing by substitution
   e. describe mouse cleaning procedures
3. identify computer monitor and display types and can
   a. define display terms
      i. pixel
      ii. VGA
      iii. SVGA
   b. describe the function of the graphics card
   c. describe monitor picture construction
      i. aspect ratio
      ii. non interlaced scanning
      iii. refresh rate
d describe the colour triangle for additive mixing
e define terms related to colour
   i hue
   ii luminance
   iii saturation
   iv colour depth
f recognise a colour monitor block diagram
g state power supply ratings
h define the energy saving function
i state the function of each block
j define display distortions
   i barrel
   ii pincushion
4 identify the colour monitor cathode ray tube and can
   a summarise the constructional features of colour CRTs
   b describe aspects of CRT operation
      i control of beam intensity and focus
      ii electromagnetic deflection
      iii typical electrode potentials
   c state the need for convergence in colour CRTs
d list CRT faults
5 identify installation and commissioning requirements for a monitor and can describe
   procedures for
   a unpacking and preparation for use
   b choosing a place for the monitor
   c internal adjustments
d menu-driven adjustments
   e setting-up by means of a software package
6 identify routine maintenance requirements and field service procedures for monitors and can
   a describe procedures for cleaning a monitor externally
   b describe procedures for go/no go fault finding a monitor
   c describe substitution test procedures for a monitor
7 identify the colour liquid crystal display for a notebook PC and can
   a recognise a colour LCD
   b define a cell
c distinguish between LCD types
      i passive matrix
      ii active matrix
8 identify health and safety aspects of visual display units and can state how VDU operation hazards may be reduced

a eye strain

b fatigue due to equipment

c fatigue due to environment

d fatigue due to posture.
Unit 426 PC Technology
Outcome 3 Demonstrate an understanding of data storage modules and apply this knowledge safely in a practical situation

Practical activities
The candidate will be able to:

1. carry out routine maintenance and field service procedures for a floppy disk drive
2. carry out field service procedures for a hard disk drive
3. carry out field service procedures for a CD ROM drive

Underpinning knowledge
The candidate will be able to:

1. identify the principles of operation and applications of 3.5 inch floppy disks and drives and can
   a. describe magnetic recording of digital data
   b. describe the construction of a floppy disk
   c. state disk capacities
   d. describe procedures for floppy disk formatting
   e. outline the formatting process
   f. recognise a floppy disk drive block diagram
   g. identify FDD connecting leads
   h. state the function of the disk controller
      i. list controller types
      ii. IDE
      iii. EIDE
   i. identify the write protection method
   j. describe environmental effects on floppy disks/drives both operational and in storage
      i. electromagnetic fields
      ii. electrostatic fields
      iii. ambient conditions

2. identify routine maintenance requirements/field service procedures for floppy disk drives and can describe procedures for
   a. the use of a cleaning disk
   b. operating system testing of disks and drives
   c. removal of field replaceable FDD unit
   d. reassembly and testing
3 identify the principles of operation and applications of hard disks and drives and can
   a state the purpose of a disk operating system
   b describe the construction of a hard disk
   c state typical hard disk capacities
   d describe procedures for hard disk formatting
   e outline the formatting process
   f recognise a hard disk drive block diagram
   g identify HDD connecting leads
   h state the function of the disk controller
      i list controller types
         ii IDE
         iii EIDE
   i distinguish between fixed and removable hard drive systems
   j describe HDD failure modes
4 identify field service procedures for hard disk drives and can describe field service
   procedures for
   a operating system testing of disks and drives
   b removal of field replaceable HDD unit
   c reassembly and testing
5 identify the principles of operation and applications of CD ROMs and drives and can
   a describe the read only disk
   b state the purpose of the laser
   c state CD ROM specification
      i storage capacities
      ii speed ratings
   d recognise a CD ROM drive block diagram
   e state the function of an IDE disk controller
   f identify CD ROM drive connecting leads
   g state health and safety aspects of working on a laser device
6 identify field service procedures for CD drives and can describe field service procedures for
   a testing disks and drives
   b removal of field replaceable CD ROM drive unit
   c reassembly and testing.
Unit 426  PC Technology
Outcome 4 Demonstrate an understanding of current printers and apply this knowledge safely in a practical situation

Practical activities
The candidate will be able to:
1 install and commission a printer.
2 carry out routine maintenance and field service procedures on a printer.

Underpinning knowledge
The candidate will be able to:
1 identify the principles of operation and applications of the black inkjet printer and can
   a describe the inkjet (bubble jet) principle
   b recognise the ink cartridge
   c describe print head movement
   d state the method of paper handling
   e state output specification
      i printing speed (characters/second)
      ii printing mode (dpi)
   f identify printer connections
      i mains cable
      ii printer cable
   g state printer power supply specification
   h identify and use suitable printer paper
      i paper types
      ii paper storage conditions
      iii loading paper
2 identify installation and commissioning requirements for a printer and can
   a describe procedures for
      i unpacking and preparation for use
      ii removal of shipping packing from moving parts
      iii choosing a place for the printer
      iv making printer connections
      v repacking the printer for transportation
b describe commissioning procedures
   i operation of printer controls
   ii installation of black ink cartridge for the first time
   iii installation of Windows printer driver
   iv printer self test
3 identify routine maintenance requirements and field service procedures for printers and can
   a describe procedures for
      i cleaning a printer
      ii cleaning the print head
      iii replacement of exhausted black ink cartridge
   b describe field service procedures for
      i using self diagnostics
      ii testing
      iii removal of field replaceable units
      iv reassembly and testing
4 identify the principles of the laser printer and can
   a outline the laser printer principle
   b make comparisons with the ink jet printer based on
      i initial cost
      ii cost per printed page
      iii print quality
      iv printing speed
5 identify procedures for correct disposal of waste materials and can
   a describe safe disposal of
      i sharp objects
      ii fluorescent tubes
      iii glass optic fibre offcuts
      iv cathode ray tubes
      v laser units
   b describe re-use or recycling opportunities
      i recycling of computer boards
      ii reclaim or recycling of packaging
   c state the customers right to retain waste materials from a repair or installation
6 identify employees' responsibilities towards the maintenance of field service safety and can
   a state the importance of safe driving of service vehicle
   b state the need for observing safe practices on customers' premises
   c ensure safety of repair or installation on completion
   d report accidents which occur in the field to employer
e. report driving accidents to employer
   HAS AWA 1976
   Reporting of Injuries (RIDDOR) 1995
   Notification of Accidents etc (1980)
Unit record sheet

Use this form to track your progress through this unit.

Tick the boxes when you have covered each outcome. When they are all ticked, you are ready to be assessed.

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City & Guilds Registration Number .........................................................

Quality nominee (if sampled) .................................................. Date ..................................  

Assessor Signature .................................................. Date ..................................  

External Verifier Signature (if sampled) .................................................. Date ..................................

Centre Name .......................................................... Centre Number ..................................