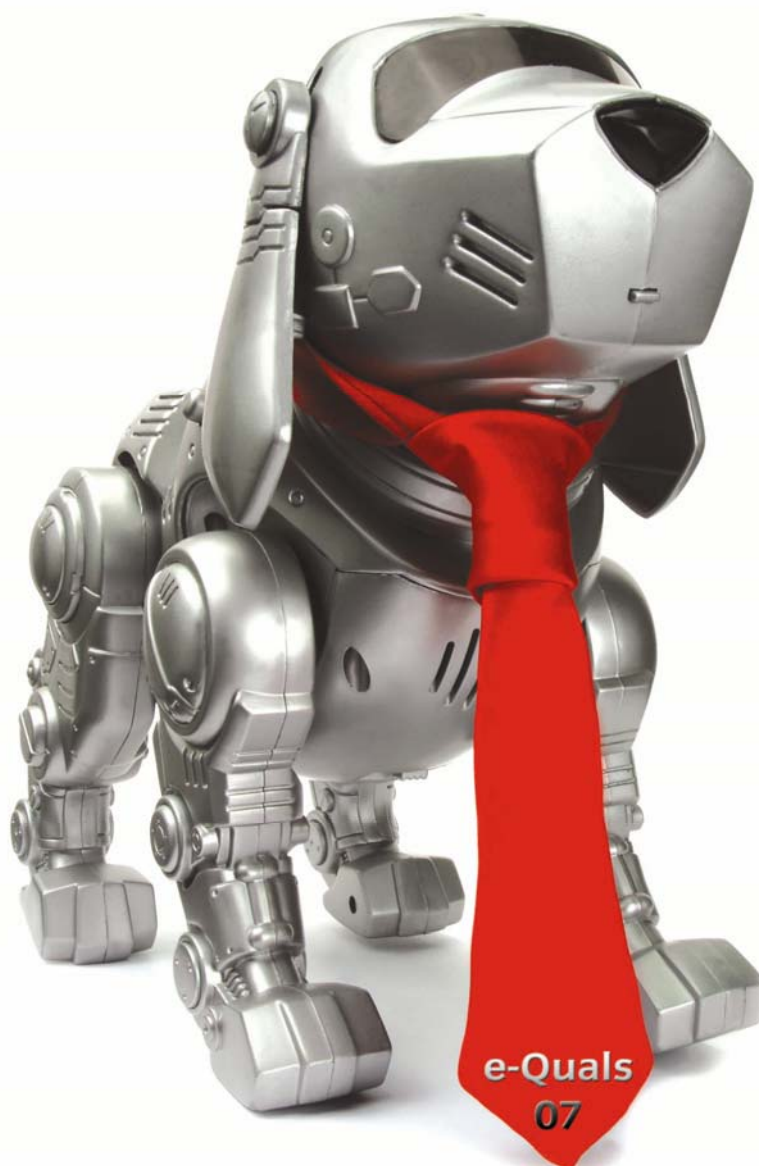


e-Quals Unit Syllabus

Level 2 Electronic devices and testing
(7267-423)



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Rationale

This unit concerns the application of semiconductor devices, assembly and testing techniques.

Learning outcomes

There are **two** outcomes to this unit. The candidate will be able to demonstrate an understanding of:

- semiconductor diodes and d.c. power supplies
- semiconductor active devices

Assessment and grading

Assessment will be by means of a **set assignment** covering both practical activities and underpinning knowledge.

Unit 423

Electronic devices and testing

Outcome 1

Demonstrate an understanding of semiconductor diodes and d.c. power supplies and apply this knowledge safely in a practical situation

Practical activities

The candidate will be able to:

- 1 test semiconductor diodes
- 2 set up d.c. power supply units
- 3 assemble diode, rectifier and IC regulator circuits
- 4 use instruments to observe circuit behaviour

Underpinning knowledge

The candidate will be able to:

- 1 identify semiconductor diode devices and can
 - a define the diode as a one way device based on silicon or germanium
 - b identify anode and cathode associated with P and N regions respectively
 - c recognise common diode types, symbols and coding
 - i signal
 - ii power
 - iii zener
 - iv LED
 - d describe diode I/V characteristics
 - e describe procedures for testing diodes with multimeters
 - f state where to obtain data on device connections
 - g state O/C and S/C faults occur in diodes
 - h explain half wave rectifier operation
 - i waveforms
 - ii average value concept
- 2 identify d.c. power supplies and can
 - a set-up d.c. power supply units
 - i fixed
 - ii variable
 - iii split voltage
 - b recognise a power supply block diagram
 - c recognise a packaged bridge rectifier
 - i pin connections
 - ii mounting methods

- d describe the operation of functional blocks in b)
 - i half wave rectifier
 - ii full wave bridge rectifier
 - iii bi-phase transformer fed full wave rectifier
 - iv filter
 - v IC regulator and regulation curve
- e describe battery charger function and mode
 - i constant voltage
 - ii constant voltage
- f describe procedures for practical measurements and electronic assembly
 - i selection and care of instruments for circuit testing
 - ii identification and care of tools needed for assembly tasks
 - iii handling and mounting precautions for components
 - iv assembly (on strip board and/or prepared PCB) of diode, rectifier and IC regulator circuits
 - v use of instruments to observe circuit behaviour
 - vi health and safety aspects of the assembly processes.

Unit 423

Electronic devices and testing

Outcome 2

Demonstrate an understanding of semiconductor active devices and apply this knowledge safely in a practical situation

Practical activities

The candidate will be able to:

- 1 test NPN and PNP BJT devices using a multimeter
- 2 assemble and test BJT CE amplifier circuits
- 3 test IC operational amplifier circuits
- 4 carry out component removal and replacement procedures

Underpinning knowledge

The candidate will be able to:

- 1 identify bipolar semiconductor transistor devices and can
 - a identify pin connections
 - b draw circuit symbols
 - c state methods of coding
 - d state where to obtain data on device connections
 - e identify parts of a BJT a.c. amplifier
 - i input
 - ii output
 - iii load
 - f give examples of practical heatsinks for power transistors
 - i mounting method
 - ii use of heat sink compound
 - g describe procedures for practical measurements and electronic assembly
 - i identification and care of tools needed for assembly tasks
 - ii selection and care of instruments for circuit testing
 - iii BJT testing using a multimeter
 - iv common BJT O/C and S/C faults
 - v BJT common emitter amplifier assembly using prepared PCB
 - vi use of instruments to observe circuit behaviour
 - vii component removal and replacement techniques using solder wick and solder suckers
 - viii health and safety aspects of the assembly processes

- 2 identify integrated circuits and can
 - a recognise packaged resistor networks
 - i SIL
 - ii DIL
 - b give examples of IC packaging
 - i pin numbering
 - ii coding
 - c state where to obtain data on device connections
 - d recognise examples of common operational amplifier ICs
 - i single
 - ii multiple
 - e describe handling procedures for electrostatic sensitive devices
 - f describe procedures for practical measurements and electronic repair
 - i identification and care of tools needed for repair tasks
 - ii selection and care of instruments for circuit testing
 - iii testing op amp circuits using a prepared circuit
 - iv component removal and replacement techniques using solder wick and solder suckers
- 3 identify health and safety aspects of assembly processes and can
 - a use hand tools correctly and safely
 - b use powered tools correctly and safely
 - c use high temperature tools correctly and safely
 - d dispose of waste material safely
 - i sharp objects
 - ii lamps
 - iii electrolytic capacitors
 - iv power transistors
 - v discharged cells and batteries
- 4 identify the principles and limitations of first aid and can
 - a state the aims of first aid
 - b state the limits of first aid
 - c know when to offer first aid
 - d know when to seek further support
 - e describe the basic first aid treatment for minor injuries.

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.

Outcome	✓	Date
1 Demonstrate an understanding of semiconductor diodes and d.c. power supplies and apply this knowledge safely in a practical situation	<input type="checkbox"/>	
2 Demonstrate an understanding of semiconductor active devices and apply this knowledge safely in a practical situation while observing safe practices	<input type="checkbox"/>	

Candidate Signature Date

City & Guilds
Registration Number

Quality nominee
(if sampled) Date

Assessor Signature Date

External Verifier
Signature (if sampled) Date

Centre Name Centre Number

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