



**Australian Government**

**Assessment Requirements for ICTTEN435  
Solve electrical-based telecommunications  
circuitry and cabling problems**

**Release: 1**

## Assessment Requirements for ICTTEN435 Solve electrical-based telecommunications circuitry and cabling problems

### Modification History

Release	Comments
Release 1	This version released with ICT Information and Communications Technology Training Package Version 5.0.

### Performance Evidence

The candidate must demonstrate the ability to perform the tasks outlined in the elements, performance criteria, and foundation skills, and to:

- apply work health and safety (WHS) procedures to problem-solving electrical circuitry and cables
- connect suitable test devices incorporating a multimeter and an oscilloscope to investigate operational parameters within AC and DC circuit/s
- perform measurements and calculations on both series and parallel circuits by comparing actual readings with calculated values
- calculate and verify through tests the voltage, current and resistance in both a series and parallel AC/DC given circuit
- apply fault-finding techniques to rectify at least three electrical issues in telecommunications AC/DC circuits
- use circuit characteristics including inductance, impedance and capacitance to improve electrical or signal performance for two basic electronic filter designs
- resolve three electrical issues in an AC/DC circuit.

Note: Evidence must be provided at least once when a specific volume or frequency is not stated.

### Knowledge Evidence

The candidate must demonstrate the knowledge required to perform the tasks outlined in the elements, performance criteria, and foundation skills, which includes knowledge about:

- safe work practices in electrical work including relevant codes of practice
- localised electrical regulatory requirements including limitations of certain electrical work
- hazards and risks involved in using electrical instruments and the safety control measures within a telecommunications system
- principles of AC and DC electricity and how they impact telecommunications work including:

- AC and DC electrical International System of Units (SI units)
- symbols used to represent an electrical energy source, a load, a switch and a circuit protection device in a circuit diagram including:
  - series and parallel circuits for AC and DC circuits
  - Ohm's Law and other relevant calculations for AC and DC circuits
  - common circuit configurations
  - current and voltage phase relationships
- waveform characteristics caused by resistance, inductance and capacitance in AC and DC circuits
- common faults that cause an increase or decrease in resistance, voltage and current found in telecommunications circuits
- definitions of electrical terms: period, peak, peak-to-peak, instantaneous, average, root-mean-square value in relation to electrical waveforms
- AC electrical generation producing a sinusoidal waveform including:
  - differences between analog and digital signals and devices
  - sinusoidal, pulsed, and static value waveforms found in AC circuitry
  - characteristics of resonance in AC circuits
- transformer use in electrical circuits including:
  - basic construction, operating principles and use of transformers
  - step-up, step-down, turns ratios, voltage and current ratios
  - verification of operation of transformer circuit
- fault-finding techniques including:
  - half circuit split
  - quarter circuit split
  - towards or away from source
- selection and use of testing equipment in telecommunications circuitry including:
  - test devices used for signal measurement
  - test devices for voltage, current and resistance
- telecommunications signal conversion characteristics including:
  - analog and digital signals
  - signal transmissions
  - application of binary to decimal conversion and vice versa
  - 4-bit binary codes with their decimal equivalent to represent output voltages of a digital to analog converter
  - techniques to convert analog signals to digital and digital signals to analog
  - principles of analog and digital electronics limited to block diagrams common to analog and digital circuits
  - components, circuits and uses of common electronic signal filters in telecommunications (high-pass, low-pass and band-pass)
- transformer use in electrical circuits including:
  - construction and operating principles and uses

- step-up, step-down, turns ratios, voltage and current ratios
- verification of operation of transformer circuit
- typical telecommunications electronic devices, cable types and their applications
- common telecommunications cables, their characteristics of use and application
- features and applications of shielding within telecommunications cables, 'skin effect' in cables and transmission losses.

## Assessment Conditions

Skills must be assessed in a workplace or simulated environment where conditions are typical of those in a telecommunications work environment or workplace.

Access is required to:

- appropriate AC and DC testing equipment
- test devices that include a multimeter and an oscilloscope for waveform observation
- manufacturer documentation and equipment
- safety equipment
- codes of practice.

Assessment in a simulated environment will require extra low voltage to be used.

Assessors of this unit must satisfy the requirements for assessors in applicable vocational education and training legislation, frameworks and/or standards.

## Links

Companion Volume Implementation Guides are available from VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=a53af4e4-b400-484e-b778-71c9e9d6aff2>