

APPLY ELECTRICAL PRINCIPLES III

UNIT CODE:0713441 14A

TVET CDACC UNIT CODE: ENG/OS/MDE/CC/11/5/MA

UNIT DESCRIPTION

This unit describes competences required to apply electrical principles. Competences include performing electrical measurements, applying basic electrical machines, applying three phase power supply and applying transients in dc circuits.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements. <i>(Bold and italicized terms are elaborated in the Range)</i>
1. Perform electrical measurements	1.1 Types of instruments are identified as per work procedure. 1.2 Construction and operation of instruments is demonstrated as per work procedure. 1.3 Methods of range extension are applied as per work procedure. 1.4 Null-indicating instruments are identified as per work procedure. 1.5 Calculations involving electrical instruments are performed as per the formula. 1.6 Instrumental/systematic errors and mitigations are demonstrated as per work requirement. 1.7 Calculations involving systematic errors are performed as per the formula.
2. Apply basic electrical machines	2.1 Electrical machines are identified as per work requirement. 2.2 Operations involving <i>electrical machines</i> are applied as per machine type.

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	<p>2.3 Generator e.m.f equation is derived as per AC working principles.</p> <p>2.4 Electrical machines are controlled as per work procedure.</p> <p>2.5 Calculations involving electrical machines are performed based on formula.</p> <p>2.6 Applications of electrical machines are identified as per work requirement.</p>
3. Apply three phase power supply	<p>3.1 Principles of three phase power generation is demonstrated as per AC fundamentals.</p> <p>3.2 Connections of three phase power supply are performed as per load requirement.</p> <p>3.3 Calculations involving three phase power supply connections are performed as per the circuit theories.</p> <p>3.4 Three phase power is measured as per IET regulation.</p>
4. Apply transients in DC Circuits	<p>4.1 Growth and decay equations are derived in R-L and R-C circuits as per working principles.</p> <p>4.2 Growth and decay curves in R-L and R-C circuits are sketched as per equation.</p> <p>4.3 Calculations involving Growth and decay in R-L and R-C are performed based on the time constants.</p> <p>4.4 Effect of time constant in switching inductive and capacitive loads is applied as per work procedure.</p> <p>4.5 Passive and active filters are analyzed as per the applications.</p>

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Range
1. <i>Electrical machines</i> may include but not limited to:	<ul style="list-style-type: none">• DC motors• DC generators• AC single phase motors• AC three phase machines: Induction, Synchronous• Transformers

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required Skills

The individual needs to demonstrate the following skills:

- Apply basic Electrical formulas
- Use of basic Electrical instruments
- Perform various unit conversions of Electrical quantities
- Power factor correction
- logical thinking
- problem solving
- applying statistics
- drawing graphs
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

- Electrical power calculations
- Various laws in Electrical engineering

- Electrical formulas
- Power triangle
- SI units of various electrical parameters
- Selecting the correct type of electrical machines for various uses
- Types and purpose of measuring instruments
- Units of measurement and abbreviations

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1 Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Performed electrical measurements. 1.2 Applied basic electrical machines 1.3 Applied three phase power supply 1.4 Applied transients in DC Circuits
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.2 Measuring equipment 2.3 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency may be assessed through: 3.1 Practical 3.2 Project 3.3 Third party report 3.4 Portfolio of evidence 3.5 Written tests 3.6 Oral questioning
4. Context of Assessment	Competency may be assessed in a workplace or a simulated workplace.

5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.
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