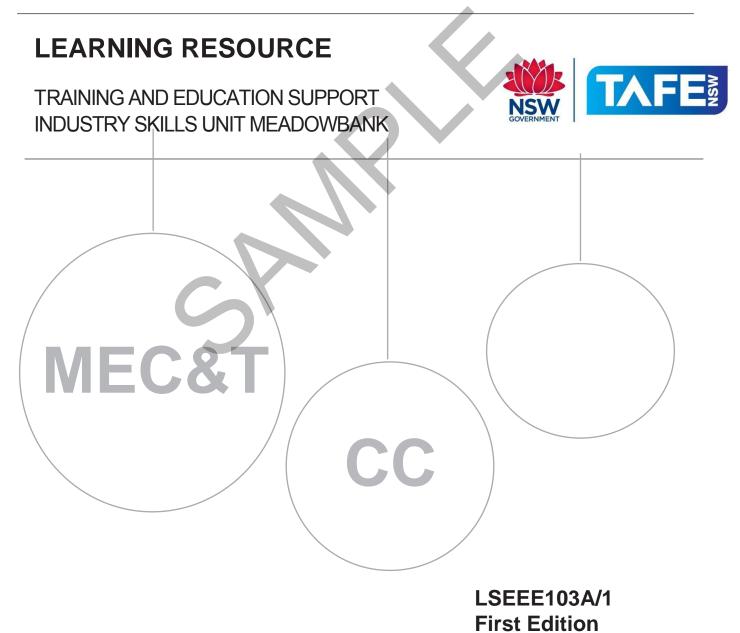
# Applied Electrical Technology 1 (LSEE103A)



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## **Section 1 - Basic Electrical Concepts**

## Purpose

In this topic you will learn about the generation, transmission and distribution of electrical energy, the properties of matter and the mechanisms of electric current flow.

## Topics

- Electrotechnology industry
- Electricity (static and current)
- Power generation of electricity
- Transportation of electricity
- Utilisation of electricity
- Basic calculations

## **Learning Objectives**

At the end of this section you should be able to:

- a) Describe the electrotechnology industry.
- b) Describe the concepts of static and current electricity.
- c) Explain how electricity is produced by renewable and non renewable energy sources.
- d) Describe how electricity is transported from the source to the load via the transmission and distribution systems.
- e) Explain how electricity is utilized by the various loads.
- f) Perform basic calculations involving quantity of electricity, velocity and speed with relationship to the generation and transportation of electricity.

## References

You will find the information to undertake this topic in the following references. At least one reference text should be used.

- Jenneson, J.R., 2003 *Electrical Principles for the Electrical Trades*, 5th Ed., McGraw Hill Sydney. Chapter 1 & 2.
- Hampson, J., 2005, *Electrical Trade Principles A Practical Approach*, Pearson Education, Sydney. Section 1.
- Phillips, P., 1996 Electrical Principles 1, Thomas Nelson, Melbourne, 1996. Chapters 1 & 2.
- Batty, I., *Electrical Principles 1*, Prentice Hall, 1996 Sydney. Chapter 1.
- Lowe J.F., *Electronics for the Electrical Trades 4th Ed.* McGraw Hill. Sydney. 1989. Appendix A.
- Boyle G, ARAC, 4th Edition, Volume 1, Chapter 11 Electrical Principles.



## Learner Exercises

A constant current of 1 ampere is maintained in a circuit for 1 hour. Determine the quantity of electricity used in coulombs.

Solution:

Step 1. List data and make sure it is in S.I. units

$$I = 1 A$$

t = 1 h = 3600 s

Step 2. State equation and substitute data

$$Q = It$$
$$= I \times 3600$$
$$= 3600 C$$

Step 3. Answer = 3600 C or 3600 coulombs

### Learner exercise 1.1

A cell supplies a current of 5 amperes continuously to a circuit for 48 minutes. Determine the quantity of electricity passed through the cell and delivered to the circuit.

## Learner exercise 1.2

An electro chemical separation bath requires 18 000 coulombs of electricity in 1 hour. What is the value of current? (Hint: you will need to transpose the equation to make I the new subject)

### Learner exercise 1.3

How many minutes would it take a steady current of 15 amperes to supply 1350 coulombs of electricity to a circuit? (Hint: you will need to transpose the equation to make time the new subject)



#### Learner exercise 1.4

A motor cyclist leaves home and travels 50 km East, 40 km North and 20 km West. If the journey takes two hours, calculate:

(i) his speed in kmh<sup>-1</sup>

(ii) his velocity in ms<sup>-1</sup>

### Learner exercise 1.5

Draw and label a block diagram to outline the components of the electricity generation, transmission and distribution system in Australia.



## **Review questions**

These questions will help you revise what you have learnt in this topic.

1.	The smallest possible part of an element that can exist in free state is	
2.	A negative ion is one having of electrons.	
3.	All electrons have a electrical charge.	
4.	A is the fundamental positively charged particle of an atom.	
5.	An atom with a deficiency of is termed a positive ion.	
6.	The nucleus of an atom consists of neutrons, which have no resultant charge, and	
	which have a charge.	
7.	The practical S.I. unit of velocity is the	
8.	In the atomic structure of an element, a negative charge is exhibited by the:	
	(A) electron	
	(B) neutron	
	(C) proton	
	(D) atom.	
9.	In the atomic structure of an element, a positive charge is exhibited by the:	
	(A) electron	
	(B) neutron	
	(C) proton	
	(D) atom.	
10		
10.	An atom that has gained or lost an electron is termed a/an:	
	(A) atom (B) mulaus	
	(B) nucleus	
	(C) ion (D) isotope	
	(D) isotope.	

