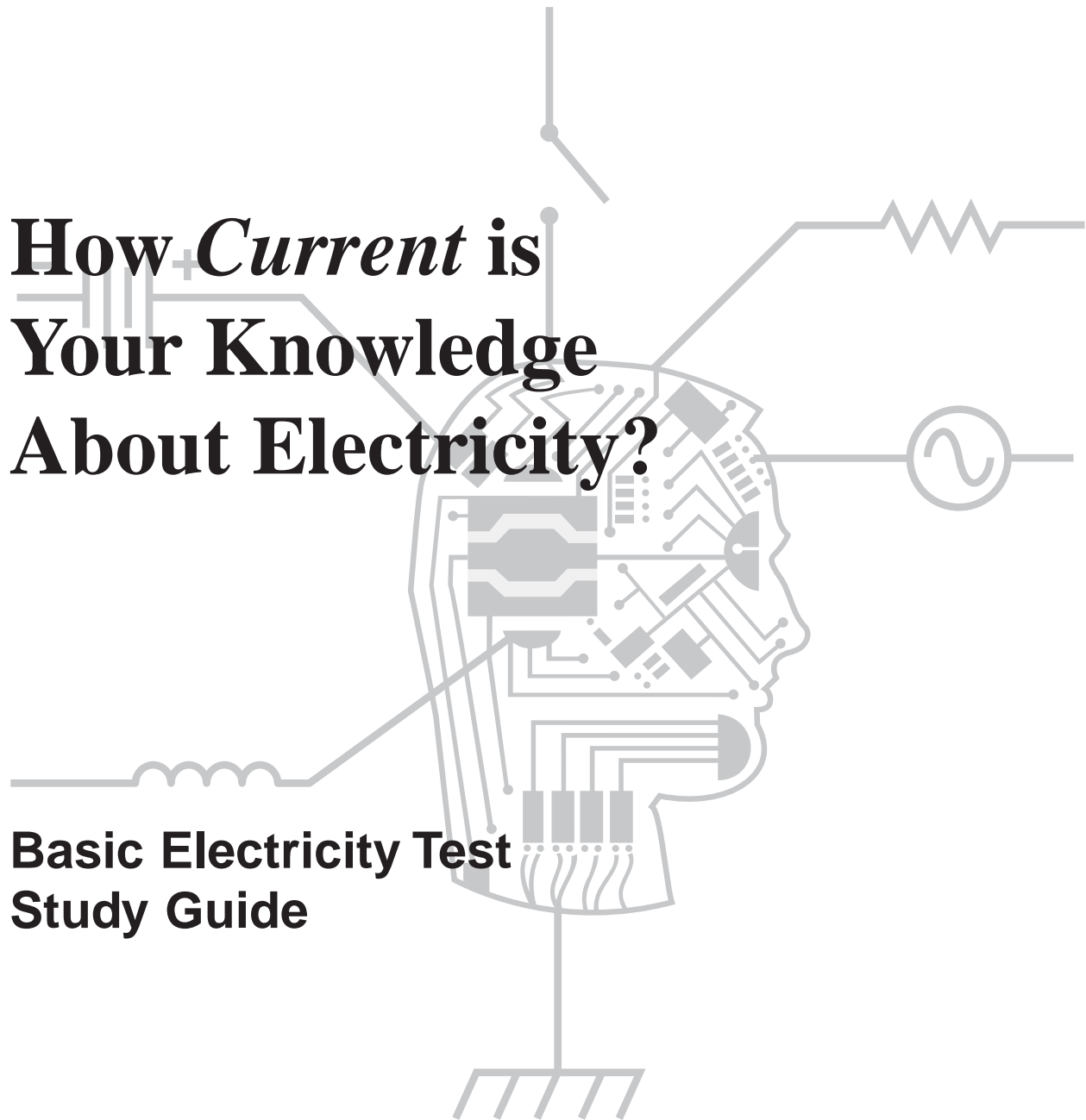




# How *Current* is Your Knowledge About Electricity?

## Basic Electricity Test Study Guide



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BellSouth will consider requests for testing accommodations from individuals covered by the Americans with Disabilities Act. Documentation of the need for the accommodation may be required.



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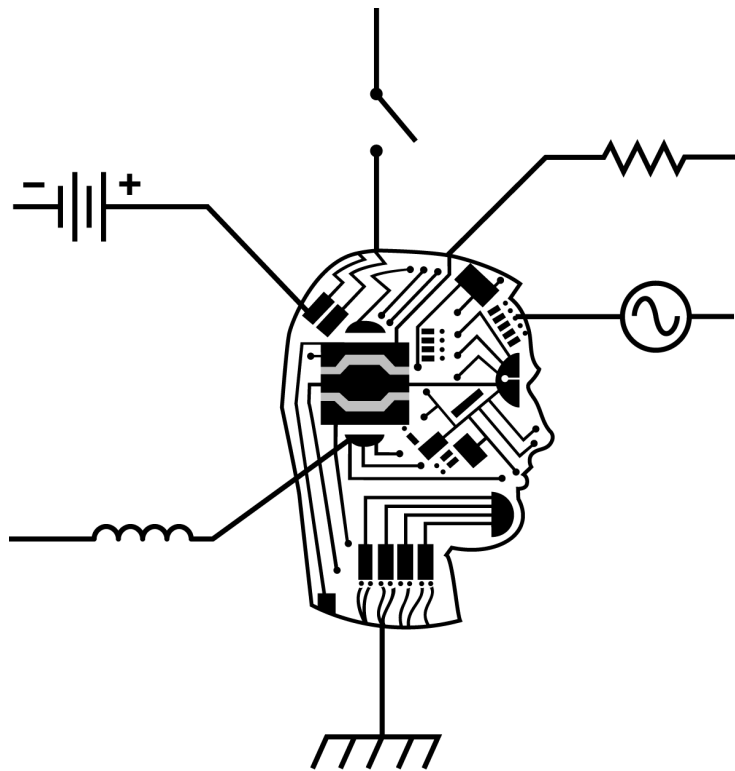
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# Basic Electricity Test Study Guide

## Section 1—Skills and Knowledge Checklist



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## Introduction

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**Overview**

This Study Guide is designed to familiarize you with the basic electricity knowledge and skills required by BellSouth's technical jobs and covered by the Basic Electricity Test. It will also familiarize you with the test, help you decide if you're ready to take it, and guide your preparation if you're not ready at this time.

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**What does the Basic Electricity Test cover?**

It covers four main subject areas:

- Electricity Fundamentals
  - ⇒ Electrical Concepts
  - ⇒ Schematic Reading
  - ⇒ Circuit Measurements
  - ⇒ Circuit Identification
- Alternating Current and Reactive Elements
- Safety and Protection Devices
- Multimeters

In addition, you need to know:

- Applied Math
- 

**What *exactly* do I have to know?**

Here is a list of the specific things you should know and skills you should have in order to perform a job that requires a background in basic electricity. If you know and understand these things and can apply what you know, you should do well on the test.

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## Skill and Knowledge Checklist

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**Stop! Get a pen or pencil**

Read through this list carefully and check off the box **ONLY** if you have a good understanding of that topic.

---

**Electricity Fundamentals:**

### Electrical Concepts

- Understand basic electrical principles
- Understand the laws of attraction and repulsion
- Understand the principle of charge
- Understand the concepts of current flow, electrical pressure, resistance and energy
- Understand the relationship of conductor size and length to current flow and resistance
- Identify various electrical units such as voltage, current, resistance and power
- Understand electrical static discharge and how it is generated

### Circuit Measurements

- Use Ohm's law to solve for voltage (E or V), current (I) or resistance (R)
  - Use the power formula to solve for power (P), voltage (E or V) or current (I)
  - Understand the relationships of efficiency, power input and power output in a circuit
  - Calculate the total voltage, resistance and current in simple circuits
  - Understand the process for simplifying circuits in order to determine the voltage (E or V), current (I), resistance (R) or power (P) across any circuit component
  - Know how to make circuit measurements using the appropriate test equipment
- 

*Continued on next page*



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## Skills and Knowledge Checklist, Continued

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**Electricity  
Fundamentals:  
(continued)****Circuit Identification**

- Know the three types of basic electrical circuits – series, parallel and series-parallel
- Understand the electrical operations of the three types of circuit

**Schematic Reading**

- Recognize the basic elements of a circuit
  - Recognize electrical components
  - Identify schematic diagram symbols
  - Understand the operation of an electrical circuit
  - Understand the purpose, function and operation of circuit components
- 

**Alternating  
Current and  
Reactive  
Elements:**

- Understand the concepts of capacitance, inductance and reactance
  - Understand the relationship of reactance with frequency
  - Recognize the symbols for reactance—capacitive and inductive
  - Understand the voltage (E or V) and current (I) phase relationships in reactive (inductive or capacitive) circuits
  - Understand the concept of true power (TP), apparent power (AP) and power factor (PF) in reactive circuits
- 

**Multimeters:**

- Understand how to connect a multimeter into a circuit to make voltage, current, resistance and power measurements
  - Understand the proper operation of voltmeters, ohmmeters, ammeters and watt-hour meters
  - Know how to interpret the results of multimeter operation
  - Know how to use a multimeter to find shorts and opens in an electrical circuit
  - Know how to use voltage multipliers (high voltage probes) with a multi-meter to extend its range
  - Know how to use current multipliers (current shunts) with a multi-meter to extend its range
- 

*Continued on next page*



## Skill and Knowledge Checklist, Continued

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**Safety and Protection Devices:**

- Understand the purpose and function of fuses and circuit breakers
  - Recognize schematic symbols for fuses and circuit breakers
  - Understand the purpose, characteristics and operation of devices that provide protection from current and voltage surges in electrical circuits
  - Know personal safety practices for working around electrical apparatus
- 

**Applied Math:**

- Add, subtract, multiply, and divide whole numbers and decimals
  - Manipulate positive and negative numbers
  - Manipulate powers of ten
  - Understand symbols for subunits of electrical quantities and be able to convert from one subunit to another (Examples: k = kilo = 1000,  $\mu$  = micro =  $10^{-6}$ )
  - Solve equations given a formula such as Ohm's law
  - Understand what *direct* and *inverse* relationships are
- 



---



## What Does the Checklist Tell Me?

---

**So, you knew it all...**

If you checked off ALL of the items on this list, then you probably have the skills and knowledge for any job that requires passing the basic electricity test. We still recommend that you take the practice test in Section 3. If you do well on the practice test, then you should sign up for the actual test.

---

**So, you knew most of it...**

If you checked off most of the items on the list, you should concentrate on what you DID NOT check off. Buy or borrow one of the resource books listed in Section 4, Page 8 and review it to see if it answers your questions. If you feel that your self-study session brought your skills up to par, take the practice test. If you do well on the practice test, then you should sign up for the actual test.

---

**So, you only know some of the topics...**

You probably need some additional training and education even before you take the practice test. If you're a regular full-time or regular part-time employee with at least six months of seniority, you are to participate in services offered through Employment Security PARTNERSHIP and should look at Appendix A for options. If you're not eligible for such training, then look at Appendix B for information about obtaining further education outside of BellSouth.

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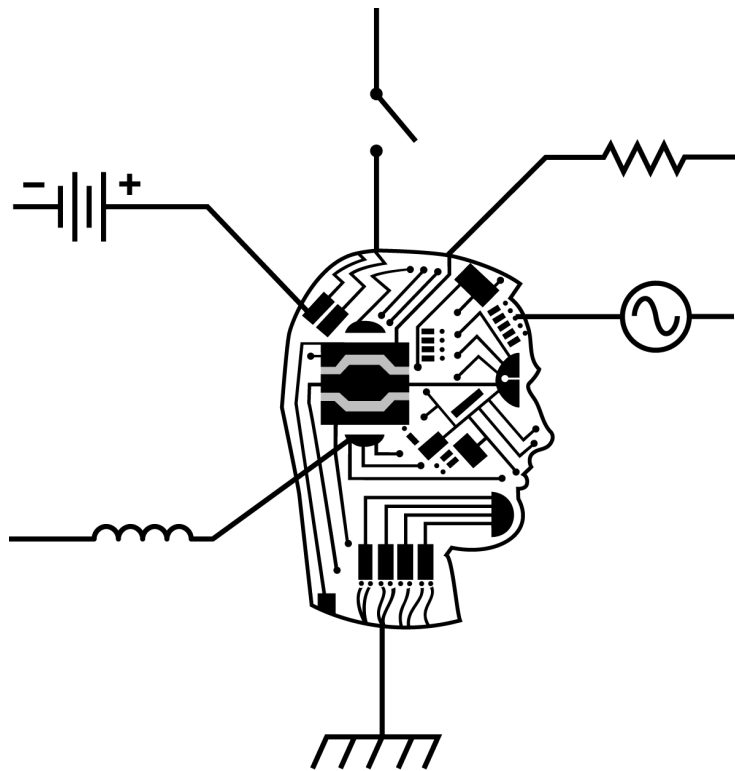


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# Basic Electricity Test Study Guide

## Section 2—Test Description





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## The Basic Electricity Test

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**What is the purpose of the Basic Electricity Test?**

To measure your knowledge and ability to apply concepts, terms, and principles involved in working on or near electrical equipment. Although the test contains some factual questions, it emphasizes your understanding of the subject and your ability to apply what you know, not just your memory for facts or formulas.

---

**Who has to take it?**

Candidates for certain BellSouth technical jobs are required to qualify on this test. Although there are no prerequisites for taking the Basic Electricity Test, without prior training or work experience in basic electricity, you probably will not do well on the test.

---

**What kind of test is it?**

It is a 60-question multiple choice test. Each question has 4 possible answers to choose from (a, b, c, d). Some questions refer to figures containing circuit diagrams or other schematics. These will be provided to you in a printed Reference Booklet.

---

**How do I take the test?**

In most locations, the test is given on a PC. Questions appear on the screen like this:

- Q: What is a “short”?

  - a. an inductor that uses no power
  - b. an interrupted circuit
  - c. an undesired conductive path in a circuit
  - d. a bare conductor

(Next Question)

Just touch the screen to indicate the answer you think is correct, answer “c” in the sample question above. When you’re ready for the next question, you press “Next Question” at the bottom of the screen. You can change your answers as many times as you wish, go back to an earlier question, or review the entire test. You will have 60 minutes to finish.

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*Continued on next page*



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## The Basic Electricity Test, Continued

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**Will I have to do any calculations?**

Yes, but you can use a calculator. You will be required to bring a calculator that is silent, handheld, and battery operated. It cannot be solar or have alpha characters on the keypad. The calculator you bring should be able to perform the following functions: Addition, Subtraction, Multiplication, and Division.

---

**Do I have to remember formulas?**

You will use formulas on the test, but you don't need to have them memorized. The Reference Booklet, which contains the figures, also lists all the formulas you might need. You can refer to it any time your memory needs jogging.

---

**How is my score determined?**

Your score will be the number of questions you answer correctly. There's no penalty for guessing, so try to answer every question.

---

**What happens if I don't pass?**

If you take the test but do not score high enough to qualify, you will have to **wait for at least six months before taking the test again.**

We strongly encourage you to use the practice test to evaluate your potential for passing the actual test. If you score poorly or are weak in certain areas, you should seek additional training or self-guided study **before** taking the Basic Electricity Test.

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## What Kinds of Questions are on the Test?

### Terms and Definitions

These questions ask for the definition of a term, the name for a concept or device, or the characteristics of a component.

*Examples:*

- Q: What is an amplifier?  
A: A device that makes sounds louder and signal levels greater
  - Q: What device is used to convert direct current to alternating current?  
A: Oscillator
  - Q: How does a digital meter's display differ from an analog meter's display?  
A: Shows digital (numeric) readout instead of a needle pointing to a mark on a fixed scale
- 

### Relationships and Principles

These questions ask how two concepts or measurements relate to each other.

*Examples:*

- Q: Holding resistance constant, how does increasing current in a circuit affect voltage?  
A: Voltage increases.
  - Q: How would adding a 20- $\Omega$  resistor in parallel with a 100- $\Omega$  resistor change the reading on an ammeter?  
A: Current would increase
- 

### Interpreting Facts

A situation or problem will be described. You will be asked to explain what's happening or what's wrong.

*Example:*

- Q: When measuring DC voltage across a device with a multimeter, the meter indicates 0 volts. What is one possible explanation for this reading?  
A: Switch is open.
- 

*Continued on next page*



## What Kinds of Questions are on the Test?, Continued

**Calculating Circuit Values** You'll be asked to figure out the amount or level of a measurement in a circuit, given other information about the circuit.

*Example:*

- Q: What is the resistance of a lamp which draws 120 mA when connected to a 12.6-V battery?  
A: 105  $\Omega$

---

**How-To** You'll be asked how to perform a task.

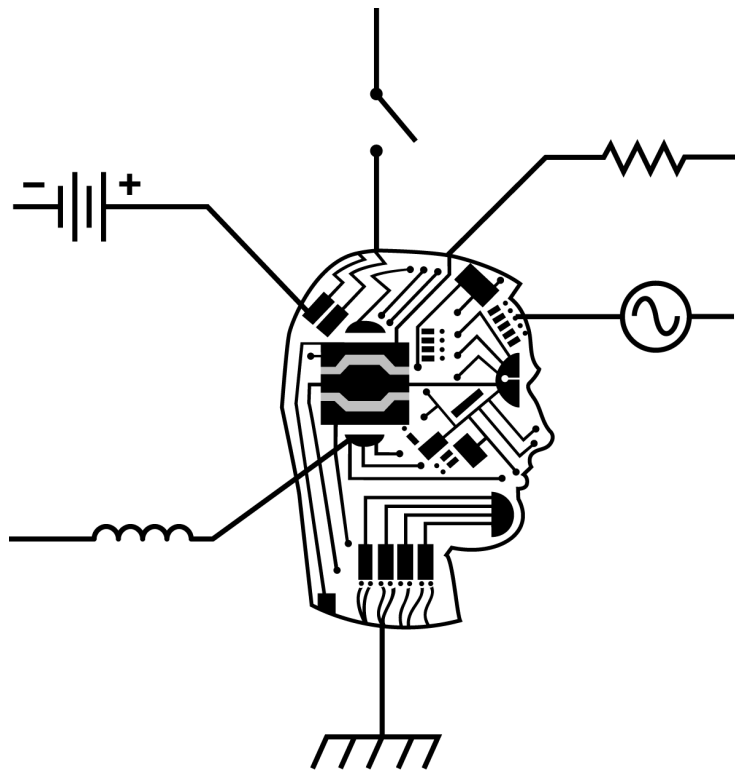
*Example:*

- Q: How should a multimeter's leads be connected when measuring resistance?  
A: Connect the test leads to the terminals on the tested device.
- 



# Basic Electricity Test Study Guide

## Section 3—Self Assessment



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## Taking the Practice Test

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### Importance of the Practice Test

This section contains a practice test of 25 questions that are similar to the questions on the real test. **If you take the actual test and do not pass, you will have to wait six months or more to take the test again!** Use this practice test to evaluate if you are ready for the real test.

---

### Practice Test Instructions

- You will need the following:
    - ⇒ This Study Guide.
    - ⇒ Paper and pencil.
    - ⇒ A calculator able to perform these functions: Addition, Subtraction, Multiplication, and Division.
    - ⇒ A watch or clock.
  - Give yourself 25 minutes to complete the test; this approximates the time you will be given to complete the actual test (the actual test is 60 questions in one hour which averages one minute per question)
  - Read each question carefully.
  - Use the Reference Sheet on page 2 to find the figures and formulas you will need.
  - Pick the best answer for each question and write the letter of your answer on a piece of paper.
  - Use the key on page 9 to score it.
  - Review the explanations, starting on page 11, for questions you missed or were unsure of.
  - Look up your score on page 17 to see how well you are likely to do on the real test.
-





# Reference Sheet

## Formulas

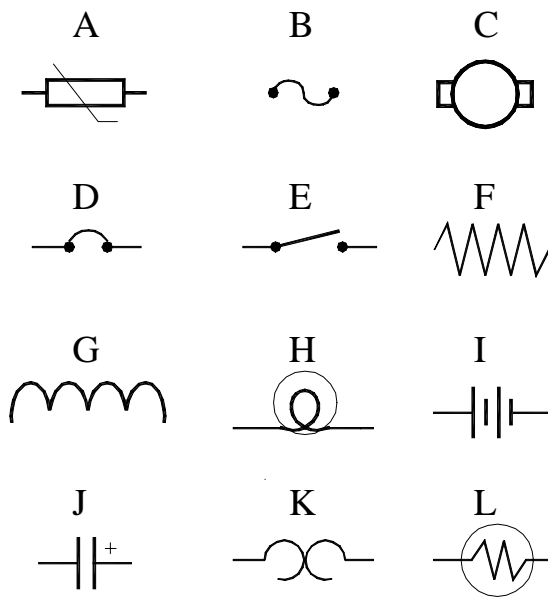
$$E = IR$$

$$P = IE$$

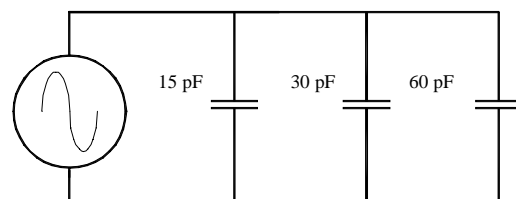
$$V_{avg} = V_{peak} \times .637$$

$$V_{rms} = V_{peak} \times .707$$

**Figure 1.**



**Figure 2.**





---


## Practice Test

1. Which of the following wires has the greatest cross-sectional area?
  - a. 9 AWG
  - b. 14 AWG
  - c. 22 AWG
  - d. 30 AWG
  
2. What is the unit of measure for electrical pressure or electromotive force?
  - a. amps
  - b. ohms
  - c. volts
  - d. watts
  
3. Which of the following circuit configurations has the same amount of voltage drop across each of its components?
  - a. parallel
  - b. series-parallel
  - c. series
  - d. combination
  
4. As temperature increases, what happens to the current-carrying ability of a wire?
  - a. There is no change.
  - b. The wire can carry more current.
  - c. The wire can carry less current.
  - d. The wire can carry no current.
  
5. In a series circuit consisting of 3 resistors of  $45\ \Omega$  each and a 50-V source, what is the approximate amount of heat produced?
  - a. 16.6 W
  - b. 18.5 W
  - c. 135 W
  - d. 150 W



6. In a two-branch parallel circuit containing one  $30\text{-}\Omega$  resistor in each branch and powered from a  $10\text{-V}$  source, what is the total current flowing in the circuit?
  - a.  $.33\text{ A}$
  - b.  $.67\text{ A}$
  - c.  $40\text{ A}$
  - d.  $60\text{ A}$
  
7. Which of the following determines total power in a series circuit?
  - a. source voltage times the current
  - b. total voltage applied to the circuit
  - c. current flowing through a switch
  - d. average of the wattage consumed by each resistor
  
8. If a resistor suddenly decreases in value (resistance decreases), what will happen to the current through the resistor?
  - a. increases
  - b. remains unchanged
  - c. decreases
  - d. fluctuates
  
9. What is the applied voltage on a circuit in which  $.5\text{A}$  is flowing and  $10\text{ W}$  is generated?
  - a.  $2\text{ V}$
  - b.  $5\text{ V}$
  - c.  $20\text{ V}$
  - d.  $50\text{ V}$
  
10. Refer to Figure 1 on the Reference Sheet. Which drawing is the electrical symbol for a source of energy?
  - a. A
  - b. C
  - c. I
  - d. J




- 
- 
11. What is the classification of an AC circuit in which the capacitive reactance is  $50 \Omega$ , the inductive reactance is  $30 \Omega$  and the resistance is  $100 \Omega$ ?
- resistive
  - inductive
  - capacitive
  - resonant
12. When using a standard multimeter to measure AC voltage, what type of measurement will the multimeter indicate?
- peak-to-peak
  - peak
  - average
  - rms
13. What happens to current flow in a capacitive circuit when the DC voltage across the capacitor is approximately equal to the source voltage?
- Current flow is optimized.
  - Little current flows.
  - Current flow is maximum at the source.
  - Current flow is maximum at the capacitor.
14. What is the term used to describe the ability of a device to store energy in the form of an electrical charge?
- inductance
  - conductance
  - reactance
  - capacitance
15. Refer to Figure 2. What is the total capacitance of this circuit?
- 15 pF
  - 30 pF
  - 105 pF
  - 160 pF



16. If the distance between the plates of a capacitor decreases while all other components of the capacitor remain the same, what happens to the capacitance of the device?
  - a. increases
  - b. remains the same
  - c. decreases
  - d. varies
  
17. In mutual induction, what passes between conductors in order to create voltage?
  - a. radiation
  - b. magnetic flux
  - c. current flow
  - d. resistance
  
18. The Henry is the unit of measurement for which of the following properties?
  - a. reactance
  - b. capacitance
  - c. resistance
  - d. induction
  
19. Which of the following devices can be used to test the windings of an inductor for continuity?
  - a. wattmeter
  - b. voltmeter
  - c. ohmmeter
  - d. Wheatstone bridge
  
20. Which of the following circuit conditions does a metal oxide varistor (MOV) protect against?
  - a. high voltage
  - b. high current
  - c. high circuit noise
  - d. high cross-talk



- 
- 
21. How should a fuse be installed in a circuit to insure proper operation?
- parallel to the load
  - series with the load
  - in any way possible
  - at the ground point
22. In a parallel circuit operating with a source of 30 VAC, designed to carry a total current of 6 A, what happens to the protection device (fuse) when the resistance suddenly changes to 2  $\Omega$ ?
- closes
  - no change
  - shorts to ground
  - opens
23. How many watts are in 100 microwatts?
- .01 milliwatts
  - .1 milliwatts
  - 1.0 milliwatts
  - 10 nanowatts
24. Which of the following is an appropriate use for a voltmeter?
- To measure difference of potential
  - To measure current flow
  - To determine total resistance
  - To determine power output
25. What should be observed when connecting a voltmeter into a DC circuit?
- rms
  - resistance
  - polarity
  - power factor



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## Scoring the Practice Test

1. Use the key answers given below to score your Practice Test.

<b>1.</b>	a	<b>11.</b>	c	<b>21.</b>	b
<b>2.</b>	c	<b>12.</b>	d	<b>22.</b>	d
<b>3.</b>	a	<b>13.</b>	b	<b>23.</b>	b
<b>4.</b>	c	<b>14.</b>	d	<b>24.</b>	a
<b>5.</b>	b	<b>15.</b>	c	<b>25.</b>	c
<b>6.</b>	b	<b>16.</b>	a		
<b>7.</b>	a	<b>17.</b>	b		
<b>8.</b>	a	<b>18.</b>	d		
<b>9.</b>	c	<b>19.</b>	c		
<b>10.</b>	c	<b>20.</b>	a		

2. Count the number of questions you answered correctly. This is your total score.
3. Make a list of the questions you missed or got right but were unsure of. Review the explanation of those questions on the following pages.





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## Explanation of Practice Test Questions

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**1-a** The larger the cross-sectional area of a wire, the greater the number of electrons it can carry. The American Wire Gauge (AWG) system provides guidelines on wire characteristics. The smaller the value of AWG, the greater the cross-sectional area of the wire. The **9 AWG** wire will have the greatest cross-sectional area of any of the choices.

---

**2-c** Electrical pressure is the push given to electrons that causes them to flow through circuits. The unit of measure for electrical pressure is the **volt**.

---

**3-a** In a series circuit, the current is equal at each point in the circuit and voltage is divided among the circuit components. In a **parallel** circuit, the voltage across each component is the same and the current is divided among the separate branches.

---

**4-c** Increasing temperatures cause electrons to be more active. The random nature of the increased activity causes collisions between thermally excited electrons and current carrying electrons. The collisions tend to disrupt the flow of electrons through the circuit. This disruption **reduces the net current flow**.

---

**5-b** Resistive elements in a circuit dissipate energy in the form of heat. Resistors connected in series are added to get total resistance. The power formula  $P = IE$  is used to determine the power used. First, use Ohm's law to find the current (I).

$$\Rightarrow I = E/R = 50/135 = .37 \text{ amps}$$

The power dissipated in heat can then be found using the power formula:

$$\Rightarrow P = IE = .37 * 50 = \mathbf{18.5 \text{ watts}}$$

---

*Continued on next page*



## Explanation of Practice Test Questions, Continued

---

**6-b** Because the voltage drop across each component of a parallel circuit is the same, Ohm's law can be used to find the current in each branch. The total current is then found by adding the current in each branch. Since in this case, the branches have equal resistance, simply find the current in one branch and multiply by the number of branches.

- Current in one branch:  $I = E/R = 10/30 = .333$  amps per branch
  - Total current of the parallel circuit:  $.333 \text{ amps} * 2 \text{ branches} = .67$  amps
- 

**7-a** The total power consumed in any circuit is a function of the power formula:

- Power = current (I) times voltage (E) or  $P = IE$
- 

**8-a** According to Ohm's law,  $I = E/R$ , current has an inverse relationship with resistance. As resistance (R) decreases, current (I) increases.

---

**9-c** Use the power formula,  $P = IE$ , to find this answer. Solving for E:

- $E = P/I = 10/.5 = 20W$ .
- 

**10-c** The symbol for an energy source, in this case a battery, is symbol I.

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*Continued on next page*



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## Explanation of Practice Test Questions, Continued

---

**11-c** In a reactive circuit, the higher value of reactance will determine whether the circuit is capacitive or inductive. Here, the capacitive reactance is higher than the inductive reactance. Therefore, the circuit is capacitive.

---

**12-d** Electricity delivered to a wall outlet is stated in terms of rms voltage. A standard multimeter provides a reading of AC voltage in terms of rms.

---

**13-b** When a DC voltage is applied across a capacitor, there will be an initial flow of current. As the voltage across the capacitor charges up to the value of the source voltage, current flow will slowly decline. At the point where the voltage is approximately equal, all current in this circuit will stop flowing because there is no difference of potential.

---

**14-d** A capacitor is a device that stores electrical energy.

---

**15-c** Capacitors in parallel are measured like resistors in series. Add the three capacitors to get the total capacitance of the circuit.

- $15 \text{ pF} + 30 \text{ pF} + 60 \text{ pF} = 105 \text{ pF}$
- 

*Continued on next page*



## Explanation of Practice Test Questions, Continued

---

**16-a** The value of a capacitor (capacitance) can be increased by increasing the surface area of the plates, increasing the value of the dielectric constant, or decreasing the distance between the plates.

---

**17-b** Magnetic flux is created as alternating current changes direction and causes lines of flux to vary in the magnetic field. As the lines of flux vary, they cause current to flow in nearby conductors.

---

**18-d** The Henry is a unit of measure for **induction**.

---

**19-c** **Ohmmeters** are used for testing continuity. Inductor windings are usually coils of wire and if not broken, can be tested with an ohmmeter for continuity.

---

**20-a** MOVs react very quickly to **over-voltage conditions**. When the voltage threshold of a MOV is exceeded, it instantly acts as a conductor, shorting the transient spike to ground. MOVs are commonly used to protect equipment that is attached to a transmission line.

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## Explanation of Practice Test Questions, Continued

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**21-b** A fuse responds to an over-current condition by opening. This separates the source from the circuit in the event of an overload. Therefore it should be connected so that it is between the source of energy and the circuit—**in series with the load**.

---

**22-d** A circuit designed to work with 30 volts at 6 amps has a load resistance of 5  $\Omega$  (Ohm's law). If the load resistance drops to 2  $\Omega$ , the circuit current will increase to 15 amps (Ohm's law) if there is no way to stop it. If the protection device (see question 21) works properly, it will **open** a circuit if current goes beyond its designed current carrying ability.

---

**23-b** 100 microwatts =  $100 * 10^{-6}$  watts = .0001 watts = **0.1 milliwatts**.

---

**24-a** Voltmeters measure **difference of potential** in electrical circuits.

---

**25-c** **Polarity** is of major importance in direct current circuits. Voltmeters are sensitive to polarity when making measurements in DC circuits. Correct placement of leads is very important when making these kinds of measurements.

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## Interpreting Your Test Score

**How Did I Do?** The Practice Test questions are very similar to—but not the same as—the questions you’ll see on the real test. Your Practice Test score will give you a good idea of how well you could expect to do on the real test but, of course, only your score on the real test counts.

Find your score level in the table below to get a good idea of how well prepared for the test you are right now.

**Table 3.1** Use the following table to interpret your score.

<b>If your Practice Test score was . . .</b>	<b>then . . .</b>
20 – 25	Congratulations! You are ready to take the real test and should have an excellent chance of qualifying. <b><i>Get ready for the test</i></b> with the help of the hints in Section 4.
15 – 19	You did pretty well but are probably a little rusty in some areas. If you took the real test now, you would have fair chance of qualifying. You can improve the odds if you <b><i>review your weak areas</i></b> first. See Section 4.
10 – 14	Although you know some of the material, your score indicates that there are some subjects that you’ve never studied or haven’t worked with in quite a while. Use Section 4 to <b><i>plan a study strategy</i></b> .
0 – 9	You do not know the material well enough to prepare on your own. If you’re still interested in taking the test, <b><i>take a course</i></b> . Find out what to look for in Section 4.



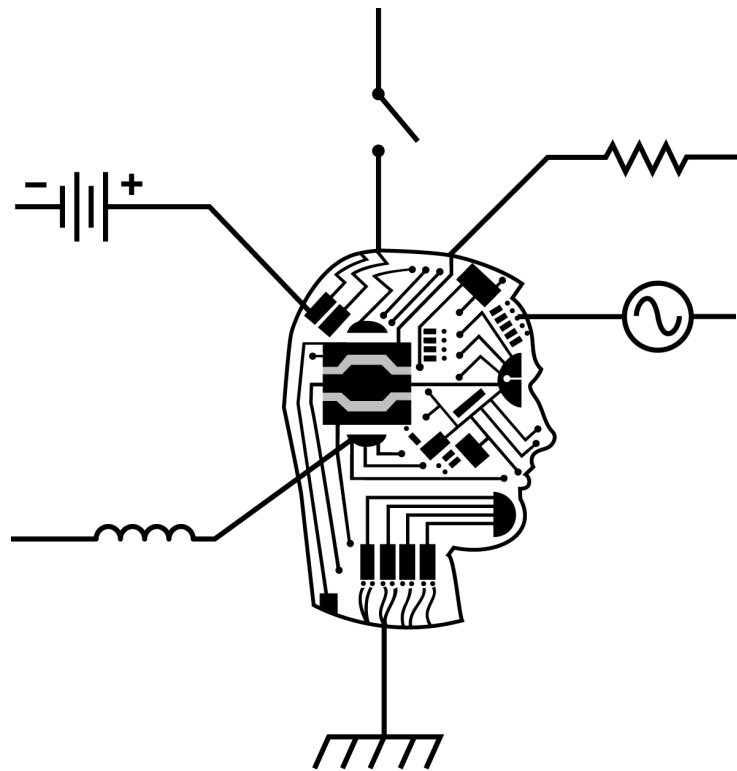


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# Basic Electricity Test Study Guide

## Section 4—Educational & Training Resources



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## Evaluating Your Needs

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### **Studying on your own**

If you did well on the practice test (15 or higher), but you still want to brush up on your skills, try studying the material on your own.

- Identify your weak areas
- Find a textbook or manual (there is a list on page 8)
- Study

Check your progress and evaluate if you need more help.

---

### **Correspondence Courses**

If you scored in the mid-teens on the practice test and feel that you need guidance with studying, then a correspondence course can be a flexible and efficient way to further your education. There are several options:

- Paper-based courses
  - Computer or web-based courses
- 

### **Classroom Training**

If you scored in the low teens or lower on the practice test, you would be well-served to take a course that offers professional instruction and testing. Sources are found in Appendix A (for eligible regular full-time or regular part-time employees) and Appendix B (for candidates who are not eligible employees)

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### **Math Skills**

Don't forget the math and calculator skills because you'll need them right away.

If you don't know how to solve simple equations or work confidently with negative numbers and decimals, get these skills first. You can either:

- Find a math review book and brush up on your own, perhaps with the help of a friend; or
- take an applied math course; or
- choose an electricity course that includes a math module at the beginning.

If you know the math basics, you can probably start right in with a basic electricity course.

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## Appendix A: Training Options for Eligible Employees

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**What is an eligible employee?**

All regular full-time and regular part-time employees with at least six months of seniority are eligible to participate in services offered through the Employment Security PARTNERSHIP. In many cases, these services are offered to eligible employees at no cost.

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**What are my options?**

Based on your individual skills and needs, you can select from any of the following options:

- Correspondence courses;
  - A computer-based course; or
- Classes from your local school or community college.
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**Keep in Mind:**

Participation in these classes should enhance the learning of skills and knowledge required for specific jobs. However, **taking a course does not always guarantee that the candidate will qualify** for the job title they are seeking.

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## Correspondence Courses for Eligible Employees

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### Introduction

The Correspondence Course Program is administered through the Employment Security PARTNERSHIP. Although this method allows more flexibility than traditional school attendance, the courses still require a fair amount of time and motivation. Systematic study, conscientious application and a high degree of self-discipline are basic requirements of each course.

There are two courses that might apply:

- CT100: Basic Mathematics Review
  - CT208: Basic Electricity
- 

### CT100: Basic Mathematics Review

A course designed to provide a review of basic arithmetic skills to continue on to a beginning algebra program or to meet the requirements of a technical program. The course covers: whole numbers, fractions, decimals, ratios, proportions and percents, measurements, signed numbers, algebraic expression and equations. A REFRESHER COURSE IN MATHEMATICS. Note: Basic arithmetic and algebra skills will be required to successfully complete any Basic Electricity training.

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### CT208: Basic Electricity

The text is written for students beginning their study of electricity. No previous formal training in the subject is required. Arithmetic and basic algebra are used in explaining and solving electrical problems. The course covers basic concepts, electrical quantities and units, basic circuits, laws and measurements, circuit components, multiple-load circuits, magnetism and electromagnetism, voltage, capacitance, inductance, transformers, R, C and L circuits and instruments and measurements.

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### How do I register for a Correspondence Course?

If you have decided you have the self-discipline and you like the flexibility of the correspondence courses, then contact the Employment Security PARTNERSHIP to register for a course. Call 780-2287 if you work in FL, GA, SC or NC (within the Atlanta calling area, call 404-780-2287); call 557-2287 if you work in AL, MS, LA, TN or KY.

You can also visit the intranet web site at [http://hr.bst.bls.com/partnership/html/ccp\\_overview.html](http://hr.bst.bls.com/partnership/html/ccp_overview.html).

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## Computer-Based Instruction for Eligible Employees

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<b>Introduction</b>	The computer-based course is available on floppy disks or as an on-line course.
<b>Basic Electricity</b>	<b>NG423P Communications Electronics (Basic Electricity)</b> This course covers the forces and elements that govern the operation of electronic circuits. The basic components that comprise communication circuits are presented individually and are used in the construction of electrical circuits. Lessons covered in the course include: DC Current and Voltage, Conductor Basics, DC Circuits, Series and Parallel Circuits, Capacitance, Inductance, AC Circuits, and Introduction to Transmission.
<b>How do I register?</b>	Contact the Employment Security PARTNERSHIP to register for the course. Call 780-2287 if you work in FL, GA, SC or NC (within the Atlanta calling area, call 404-780-2287); call 557-2287 if you work in AL, MS, LA, TN or KY.

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## Vocational Classes

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### Introduction

A classroom-based course offered by a technical school, two-year or four-year college and taught by an experienced instructor is one good choice for training, particularly if you are new to electricity. Compare the checklist of required knowledge and skills from Section 2 to the course curriculum. If you're unsure whether a certain course covers what you need, ask someone at the institution offering the course, preferably the instructor. You may wish to share the checklist with a knowledgeable person at the institution.

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### How do I register?

Contact your local school and ask them for their registration requirements.

BellSouth has an Educational Assistance program that pays for furthering your education. There are certain requirements for participating in the program.

To find out more about the Educational Assistance program, call 780-2287 if you work in FL, GA, SC or NC (within the Atlanta calling area, call 404-780-2287); call 557-2287 if you work in AL, MS, LA, TN or KY. Or visit the intranet web site at <http://hr.bst.bls.com/partnership/html/non-management.html>.

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## Appendix B: Training Options for Other Technician Candidates

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**What if I am not an eligible employee?**

If you are a candidate for a technician job, but you are **not** an eligible regular full-time or regular part-time employee of BellSouth, there are still many training options available to you. **You will be responsible for paying the cost of any of these courses.**

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**What are my options?**

Based on your individual skills and needs, you can select from any of the following options:

- Self-study using textbooks recommended on page 8
  - Paper-based correspondence courses
  - Correspondence courses via the internet
  - Classes from your local technical school or community college
- 

**Keep in Mind:**

Participation in these classes should enhance the learning of skills and knowledge required for specific jobs. However, **taking a course does not always guarantee that the candidate will qualify** for the job title they are seeking.

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## Reference Books for Self-Study

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**Where do I find these books?** The following books can be purchased at your local bookstore or on the Internet. You may also be able to check out these books from your local public library.

The cost of the reference books ranges from \$20 to \$50. The following listings are by title, author, publisher and date.

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**Mathematics:** **Basic Mathematics for Electricity and Electronics**  
Bertrand B. Singer  
Macmillan McGraw Hill  
1994

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**Basic Electricity:** **Electricity: Principles and Applications, 4<sup>th</sup> Edition**  
Richard J. Fowler  
Glencoe McGraw Hill  
1994

**Basic Electricity: A Self Teaching Guide**  
Charles W. Ryan  
John Wiley & Sons  
1986

**Basic Electricity**  
Nooger Van Valkenburgh  
PROMPT  
1993

**Teach Yourself Electricity & Electronics**  
Stan Gibilisco  
1997

**Basic Electricity**  
Milton Gussow  
McGraw Hill  
1987

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## Traditional Correspondence Courses

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**Paper-based  
self-study  
classes**

Basic Electricity Correspondence Courses are available from these vendors. These “paper-based” courses are self-study classes with reference books.

- ICS International  
P.O. Box 1900  
Scranton, PA 18505-1900 USA  
800 233-0259  
Fax # 717 343-3620  
[www.indust@icslearn.com](mailto:www.indust@icslearn.com)
  - Heathkit Electronics Educational Systems  
455 Riverview Dr.  
Benton Harbor, MI 49022  
800 253-0570  
Fax # 616 925-2898  
[www.heathkit.com](http://www.heathkit.com)
  - Cleveland Institute of Electronics  
1776 E. 17<sup>th</sup> St.  
Cleveland, Oh 44114-3679  
800 243 2446  
Fax # 216 781-0331  
[www.freeshop.com/pg00114.htm](http://www.freeshop.com/pg00114.htm)
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## Computer-Based Instruction

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### Computer Based Instruction:

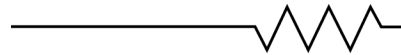
The following vendors offer Basic Electricity correspondence courses via the Internet.

- UOL - University On Line  
8251 Greensboro Drive, Suite 500  
McLean, VA 22102  
800 915-9298  
Fax # 703 893-1905  
[www.uol.com](http://www.uol.com)
  
- Heathkit Electronics Educational Systems  
455 Riverview Dr.  
Benton Harbor, MI 49022  
800 253-0570  
Fax # 616 925-2898  
[www.heathkit.com](http://www.heathkit.com)

(Beginning 3<sup>rd</sup> Quarter 1999)

- Cleveland Institute of Electronics  
1776 E. 17<sup>th</sup> St.  
Cleveland, Oh 44114-3679  
800 243 2446  
Fax # 216 781-0331  
[www.freeshop.com/pg00114.htm](http://www.freeshop.com/pg00114.htm)
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## Vocational Classes

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### **Introduction**

A classroom-based course offered by a technical school, two-year or four-year college and taught by an experienced instructor is one good choice for training, particularly if you are new to electricity. Compare the checklist of required knowledge and skills from Section 2 to the course curriculum. If you're unsure whether a certain course covers what you need, ask someone at the institution offering the course, preferably the instructor.

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### **Financial Aid**

In some cases, you may qualify for financial aid. Be sure to speak to the school's Financial Aid Office if you need assistance.

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