**Instruments, Tools and Fasteners – Chapter 2**

Read chapter 2 and complete the following:

1. There are three different meters used to measure electrical properties. For the following properties, indicate which meter would be used to measure it.  
   a) voltage -   
   b) amperage -   
   c) resistance  
   d) voltage, amperage and resistance –
2. Which meter would be best suited for general use?
3. Name the four most common screw head patterns and sketch each one.
4. Which type of pliers would be best suited for making loop ends in wire?
5. Why is it a good idea to use pliers which have plastic insulated handles?
6. Why would nut drivers be found in an electrician’s tool belt as opposed to ratchets and sockets?

Research

Which screwdriver pattern was invented by a Canadian? Explain, who, when, why and what has happened to his idea.  
  
  
  
  
  
  
Use the internet to research tool kits for electricians. Find three different suppliers of basic tools for electricians and list the tools they include. Create what you feel would be a good, basic tool kit list based on tools common to all of the lists. Have your instructor initial your activity sheet when you are completed.

Practical

Open the container of tools which comes with your workstation. Identify each of the tools and cross-reference the inventory with the inventory list. Complete a “Tool Inventory Sheet” for your work station and have your instructor initial it.

**Electrical Conductors, Insulators and Semiconductors – Chapter 3**

*Watch the video clips “How Electricity Works”, “Electric Currents AC & DC” and read chapter 3.*

1. Explain the difference between conductor, insulator and semiconductor.
2. What would a continuity tester be used for?
3. Explain the difference between “electrical” devices and “electronic” devices.
4. What does the term “solid state” refer to?

**Sources of Electromotive Force – Chapter 4**

1. Electricity is the flow of electrons. This requires a flow of voltage, which is also referred to as *electromotive force*. There are many primary sources of energy which can be converted into electrical energy. For each of the following primary sources, give an example of the equipment or item they would be used in.  
   light -   
     
     
     
   chemical reaction -   
     
     
     
   heat -   
     
     
     
   piezoelectric effect -   
     
     
     
   mechanical-magnetic -

**Basic Electrical Units – Chapter 5**This chapter deals with the real meat and potatoes – as it were – of what this course is all about. By the end of this chapter, you should be fairly comfortable with the terminology, procedures and basic understandings of electricity and simple circuits. The last part of this chapter will be dealing with actually building some circuits and beginning to use some of the equipment you have in your workstation. Why mention this now? Because, it has been pretty boring till now and you need to know things are going to be changing soon.

Watch the videos “Resistance In Circuits” parts 1 & 2. Read chapter 5 in your text.

1. Complete the following chart:

|  |  |  |
| --- | --- | --- |
| **Term** | **Symbol** | **Definition**  **Definition** |
| Ampere |  |  |
| Volt |  |  |
| Ohm |  |  |
| Milli |  |  |
| Micro |  |  |
| Watt |  |  |
| Joule |  |  |
| Watthour |  |  |
| Kilo |  |  |
| Mega |  |  |

1. The formula for power is: Power =Voltage x Current or (P=VI). Calculate the following. Be sure to use the proper units.  
   a) V=12, I=24, P=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b) V=110, P=600, I=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   c) V=1.5, I=.003, P=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c) V=3, P=250, I=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   d) I=30mA, P=600w, V=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ e) V=45v, P=15w, I=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   f) P=1200w, V=2000v, I= \_\_\_\_\_\_\_\_\_\_\_\_\_\_ g) V=115v, I=15mA, P= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Basic electric circuits contain at least three components: power source, conductor, and load. A control device, and protective device can also be added. Explain what each of the six parts of a circuit do and give examples for each.

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ circuits allow current to flow. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ circuits don’t allow current to flow.

Watch the video “Ohm’s Law Part 2: Ohm’s Law Applied to Simple Circuits”.

1. The relationship between current, voltage and resistance is defined by *Ohm’s Law*: I =V/R (Current=Voltage/Resistance). The formula can be manipulated to solve for voltage (V=IR) and resistance (R=V/I). Complete the following chart using Ohm’s Law. Make sure to use the correct units.

|  |  |  |
| --- | --- | --- |
| **I (current)** | **V (voltage)** | **R (resistance)** |
| 4 A | 12 V |  |
| .5 mA | 115 V |  |
|  | 4.5 V | 47 kΩ |
| 1 A |  | 100 Ω |
|  | 12 V | 100 kΩ |
| 30 A | 110 V |  |
| 10 µA | .2 mV |  |

1. What is the direction of current flow in a circuit? (using the electron flow model)

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