Electrical Connections – Chapter 6

Read Chapter 6 and complete the following:

1. What is the difference in resistance between a well made connection and a poorly made connection?  
   Poorly made connections restrict the flow of energy – energy is lost in the form of heat and there is more resistance

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1. Name two ways to strip the coating off an insulated wire.  
   with a knife or wire stripper
2. What are two important things to remember when attaching wires to terminal screws?  
   don’t strip too much insulation and wrap it in the right direction
3. What is a benefit to using crimp-type connectors when joining wires?  
   they are fast; they are removable
4. Give examples of three mechanical connectors.  
   crimp-on ; twist-on; set screw; single lug
5. What type of connector is generally used for larger cable installations?  
   single conductor lug cable connector
6. What type of connector is commonly found in household electrical outlets?  
   twist-on
7. How is a set-screw connector different from a twist-on connector?  
   the wires are held together with a connector using a set screw, then it is threaded into a plastic insulator
8. Two ways to insulate electrical connections are \_\_electrical tape\_\_\_ and \_\_heat shrink\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The easier of the two is \_\_\_\_electrical tape\_\_\_\_\_\_\_ because \_\_\_\_heat shrink\_\_\_\_\_\_ insulation requires \_\_\_ a hot air source/heat gun to melt it\_\_\_.
9. What is the difference between soldering and mechanical connections?   
   soldering: requires heat, solder, flux; is semi-permanent; cannot be removed without heat  
   mechanical connection requires no heat; is easily reversed without heat

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1. What is a reason for soldering a connection? When would you not want to solder a connection?  
   permanent; aversion to loosening;  
   don’t solder in fragile situations; requires specific skills; not best for temporary joins
2. What is the purpose of flux? What is the easiest way to use flux when you are soldering?  
   cleans; prevents oxidation; prepares metal surface to accept solder
3. What safety precautions must be taken when soldering?  
   burns from hot iron; too much heat on IC board; too much heat on components; too much solder shorting connections
4. What is “tinning”?  
   preparing the tip of the soldering iron for soldering
5. Name two differences between a soldering gun and a soldering iron.  
   soldering gun has one on, four off duty cycle; not as detailed/accurate; not easy to control; heat and cool relatively quickly  
   soldering gun constant heat; more detailed; longer to heat and cool
6. What does a well made soldered connection look like? Smooth, shiny, edges blend with wire

PRACTICAL (P1) Locate the package on Soldering. Watch the video and complete the questions. Have your instructor check your work and initial your activity sheet.

1. Where are two places where you could find cable connectors at home?  
   automobile, appliances, computer, stereo, tv

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1. How are wires in cables protected from electromagnetic and radio interference ?  
   braided wire shield
2. What are two different ways to attach connectors to shielded coaxial cable?  
   crimp and solder
3. How do you solder fiber optic cable? you don’t solder fiber optic cable – you have to use special connectors

PRACTICAL (P2) Locate the solderless connectors, coaxial cable connectors, wire and crimpers from your supplies. Cut 4 pieces of wire 10cm long. Attach two pieces together using a pre-insulated butt connector. On the other ends of the same wire, attach a male and female connector using proper procedures. Join the two remaining pieces of wire together using a Western Union splice on both ends, creating a loop. Solder ONLY ONE OF THE SPLICES. Have the instructor check your work, compare it to the exemplars, and initial your activity sheet.

**Simple, Series and Parallel Circuits – Chapter 7**

Watch the video clip “Series and Parallel Circuits” and read chapter 7.

1. What can happen to a circuit if a protection device is not present?  
   overheating; fire; damage to components;
2. Name two types of protection devices used in house wiring.  
   breakers; fuses;
3. Why are conductors usually insulated?  
   so they don’t accidentally touch other components/conductors; identification; insulate from heat
4. Give examples of three control devices found in a house wiring setup.  
   light switch; dimmer switch; thermostat; timers;

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1. Different types of diagrams are used to show different circuits in different ways. Which diagram gives the least detail about actual construction, but does more to explain the function of each segment of the circuit?  
   block diagram
2. There are many symbols used in creating schematic diagrams. Fill in the following chart with the appropriate symbol.

|  |  |  |  |
| --- | --- | --- | --- |
| Component | Symbol | Component | Symbol |
| Battery |  | Lamp |  |
| AC Current Source |  | LED |  |
| Push Button Switch |  | Capacitor |  |
| Open Switch |  | Resistor |  |
| Closed Switch |  | Diode |  |
| Buzzer |  | Cds Cell |  |
| Bell |  | Variable Resistor |  |

Read and complete the “130 in One Electronics lab Tutorial” and the “Multimeter Tutorial”.

PRACTICAL (P9) a) Build a simple circuit on your lab board. Use a switch, and one LED. Measure the voltage at the source, across the switch when it is closed and across the LED when it is powered. Draw the schematic for your circuit and record the values you measure on the activity sheet.

b) Build a series circuit using a switch, and two LEDs. Measure the voltage at the source, across the switch and across each LED. Draw the schematic for your circuit and record the values you measure on the activity sheet. Make sure you label the LEDs as L₁, L₂, etc. Disconnect one wire between two of the lamps and record the results.

c) Build a parallel circuit using a switch and two LEDs. Measure the voltage at the source, across the switch and across each LED. Draw the schematic for your circuit and record the values you measure on the activity sheet. Make sure you label the LEDs as L₁, L₂, etc. Disconnect one wire between two of the lamps and record the results.

\*\*\*Show your teacher your activity sheet when you are finished and have it initialed.

PRACTICAL (P10) Using your soldering iron and tools, disassemble a device which contains electronic elements. There should be a supply of computers and peripherals available to you, but you could bring something from home, providing you have permission from home and your instructor.\*\*\*Whatever you bring in is not likely to ever work again. Make sure everyone concerned knows this!!!!\*\*\* Disassembly should follow these steps: remove the case; attempt to follow the path the electricity takes to make the device operate; attempt to diagnose any obvious problem; remove the power transformer, if possible; separate any boards or components which may by attached by screws, edge connectors, ribbon cables; attempt to disassemble some electronic components by melting solder and carefully removing the component. Make sure you keep all of your parts in a plastic tub and that you clean up after each session. You will be allowed to work on this project for as long as your instructor feels you need, or for as long as you are making good use of your time. Make a brief notation about what you accomplish each day and have your instructor initial and date your activity sheet at the end of each class

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