Electrical Safety – Chapter 1

Read Chapter 1 and complete the following.

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1. What is the leading cause of fatality accidents?
Automobile accidents
2. List three electrical safety violations or poor practices that exist – or have taken place – in your home.
Could be any of many different things. Look for improper extension cord use, appliances near water,
modified plugs (removal of ground plug), prying toast with a knife, electrical octopus, not using GFI outlets,
not turning off power before working on electrical equipment, frayed electrical cords, pulling cords instead
of grasping plug and pulling, overloading outlets, ???
3. A conductor is a material which allows electricity to pass through (conduct). The most common conductors used in electrical appliances and circuits are metal. List two other materials which can conduct electricity.
water, air, human body, green wood,
4. You will be working with electricity during this and other modules. Create a list of what you feel are the top 10 most important safety rules you need to follow while working with electricity in the school. After this list has been cleared by the instructor, tape it on the front of your Electro-Technologies binder.
5. Indicate on the following drawing of Joe Safety what specific practical safety attire must be used when working with electricity in the school shop and briefly explain why.
 each list can be different; these are the major parts

 safety glasses – components can explode
 remove jewelry – can conduct electricity
 long sleeves – can be fire hazard, catch on equipment, must be tight if worn
 tight pant legs – can catch on equipment, should be snug
 tied laces – loose laces are a trip hazard,
 safety shoes – not practical in school shop, should wear closed toe shoes, no
 high heels

Ungrounded equipment is dangerous. Explain what the danger is and what precautions help eliminate the danger.
ungrounded tools allow the user to become the ground to the circuit. Grounded equipment has a ground
plug on the plug in, or is rated as double insulated .
6. What is *lockout* and *tagout*, and how do they prevent dangerous electrical situations?
lockout is using a locking device to prevent a power source from being turned on
tagout is indicating the work that is being done on the circuit
lockout devices often have places for multiple padlocks to ensure everyone who is involved in the circuit
use or maintenance has to confirm the circuit’s safety before re-applying power

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1. a) What three factors create an electrical circuit?
resistance, voltage, current

b) Which of the three does the human body become when a shock takes place?
resistance
2. The lower the body resistance, the \_greater\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the potential electric shock hazard.
3. a) What unit is used to measure resistance? \_\_ohm\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Which specific piece of equipment is used to measure resistance? \_\_\_ohmmeter\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What unit is used to measure voltage? \_\_\_volt\_\_\_\_\_\_\_\_\_\_\_\_\_
5. a) What unit is used to measure current? \_\_\_\_\_ampere\_\_\_\_\_\_\_\_
b) The amount of current flowing through a circuit depends on \_\_\_resistance\_\_\_\_ and \_\_\_\_voltage\_\_\_\_\_.
c) How much current does it take to be considered dangerous? \_\_\_\_ .005A (5mA) \_\_\_\_\_\_\_\_\_
6. If there is enough current in a flashlight to severely injure or kill a human being, why doesn’t it hurt to pick up a battery and feel both ends at the same time?
the resistance in human skin is enough to limit flow of electricity
7. Describe two conditions where you shouldn’t work with electricity.

water present, unfamiliar equipment, faulty equipment, bare wires, rain, improper personal protective
gear, ???

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1. First aid certification is something all workers should obtain. There are, however, some very basic first aid procedures which individuals should be aware of and can use without certification. For each of the following injuries, briefly describe the first-aid practice that can be used.

a) bleeding
apply direct pressure

b) burns
application of cold water/cold packs when no open blisters are present; application of clean bandage if
open blisters; don’t remove charred clothing
c) electric shock
turn power off, remove contact from victim, don’t touch victim till power source removed, begin
first aid
2. What is the most basic way to reduce the chance of fire in the shop?
good housekeeping (sweeping, remove trip hazards, proper material storage)
3. What type of fire extinguisher should be used to fight an electrical fire?
Class C (dry powder or CO₂)
4. What is the name of the federal legislation that governs safety in the workplace? \_\_\_Occupational Safety and Health Act\_\_\_\_\_\_
5. Complete the following chart with the appropriate safety information regarding color-coding safety related items, equipment and situations:

|  |  |
| --- | --- |
| **Color** | **Items, Equipment, Situation** |
| Red | Fire protection equipment; portable containers of flammable liquids; emergency stop buttons and switches |
| Yellow/5 | Caution; physical hazards; waste containers for explosive or combustible materials; caution against starting, using or moving |
| Orange | Dangerous parts of machines; safety starter buttons; exposed parts/edges of pulleys, gears rollers, cutting devices and power jaws |
| Purple | Radiation hazards |
| Green | Safety; first aid equipment |

1. Provide a definition for the following terms:

a) resistance – opposition to flow of current in a circuit; measured in ohms

b) voltage –the pressure that causes flow of electric current in a circuit
c) current – the rate of flow of electrons in a circuit

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d) hazardous substance – can result in production of hazardous wastes

e) hazardous waste – materials which can be dangerous to the public or environment

f) corrosive – materials that can attack and destroy human tissue or materials

g) ignitable - material capable of bursting into flame

h) toxic – material which can be poisonous to people and other life forms

i) reactive – material which can explode or create poisonous gasses when mixed with other substance

j) octopus connection – plugging numerous cords into a single outlet

k) third prong – ground prong on a plug

l) permanent wiring – wiring which is not removable or is used to power permanently attached equipment

m) combustible – material which can catch on fire

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