# Basic Electricity

RV 7.11.19

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- ***WA. Electricians*** *– WA L&I require all online test questions and answers to be randomized. Be sure to answer all of the test questions on your printed copy.*

**Quiz 1** ***WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. Ben Franklin lived in the _____.
- 1700's
- 1800's
- 1900's

2. What denomination of US Currency is Ben Franklin's likeness on?
- $20
- $50
- $100

3. Which device is Ben Franklin known to have invented?
- Cotton Gin
- Lightning rod
- Horseless carriage

4. Ben Franklin invented Bifocal Glasses.
- True
- False

5. Ben Franklin was an advocate for public building safety codes.
- True
- False

6. Nikola Tesla immigrated from _____.
- Croatia
- Serbia
- Russia

7. Approximately how many inventions did Nikola Tesla patent?
- 300
- 700
- 1700

8. Nikola Tesla worked with Thomas Edison and both were long time advocates of DC power.
- True
- False

9. Which electrical power system did Nikola Tesla end up favoring?
- AC
- DC

10. AC means _____.
- air conditioning
- alternative current
- alternating current
- alternating capacitance

11. Thomas Edison lived in the _____.
- 1700's
- 1800's
- 1800's – 1900's
- 1900's

12. Did Thomas Edison develop the first light bulb?
- Yes
- No

13. After inventing the phonograph, Thomas Edison worked with George Eastman to invent _____.
- the light bulb
- the phonograph
- the telephone
- motion pictures

14. George Westinghouse was primarily responsible for _____.
- AC power transmission
- DC power transmission
- steam engine development
- telegraphs

15. Approximately how many patents did George Westinghouse hold?
- 236
- 2854
- 400

16. A well-known invention by George Westinghouse was _____.
- the air brake
- the light bulb
- turbines
- gas lighting

17. George Westinghouse was a supporter of DC Electricity.
- True
- False

18. The Moving Iron Meter was developed as what type of instrument?
- Volt meter
- Amp meter

19. The rapid increase in the use of electricity at the end of the 1800's saw a rapid increase in _____.
- electrical fires
- electrocutions
- electrical poisonings
- birth defects

20. As a result, the first _____ was formulated in 1897.
- Electrical Fire Code
- National Electrical Code
- Fire Safety Code
- Electrical Poisoning Code

21. Georg Simon Ohm was able to define the relationship between voltage, current, and resistance, which represented the true beginning of electrical circuit analysis.
- True
- False

**Quiz 2:** ***WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. An electron has a _____ charge.
- positive
- negative
- neutral

2. In a stable atom, the number of positively charged particles is _____ the number of negatively charged particles.
- equal to
- greater than
- less than

3. The positively charged particle of an element is _____.
- an atom
- an electron
- a proton
- a neutron
- none of the answers provided

4. The center of the atom, the nucleus, is made up of the following:
- A. electrons
- B. protons
- C. neutrons
- D. all of the answers provided
- E. only B and C

5. The electrons in the outer shell are known as _____.
- valence electrons
- outer orbit electrons
- M3 level electrons
- none of the answers provided

6. Materials that easily move electrons are _____.
- conductors
- insulators
- resistors
- all of the answers provided

7. Atoms that have received an extra electron are known as _____.
- depleted atoms
- charged atoms
- overcharged atoms
- full atoms

8. If a positive and negative body are joined together by a copper wire, the following would happen:
- an atomic explosion
- nothing
- electrons would move in the wire from the negative charged body to the positive charged body
- electrons would move in a wire from the lower charged body to the higher charged body

9. Which of the following is NOT an insulator?
- electrical tap
- copper wire
- gloves
- glass

10. Corrosion on the terminal is not desired because it _____.
- 1. acts as an insulator, creates resistance which results in heat at the terminal
- 2. discolors the wire's insulation
- 3. makes a system look old
- 4. allows too much electricity to flow

11. Like charges _____.
- repel
- attract
- have no effect on each other
- none of the answers provided

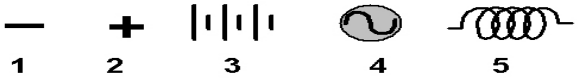
12. Which ways can electricity be produced?
- Chemical (batteries)
- Thermal
- Photo-electric
- Magnetically generated
- All of the answers provided

13. The ANODE in a battery is _____.
- positively charged
- negatively charged
- neutrally charged

14. The CATHODE in a battery is _____.
- positively charged
- negatively charged
- neutrally charged

15. An alkaline battery would use _____ as a base.
- alklinous
- sulfuric acid
- formic acid
- potassium hydroxide

16. A wet cell will have a _____ instead of a paste between the two plates.
- solid
- liquid
- gas
- electromagnetic sponge material




17. Which of the above symbols represents a negative electron or a Cathode?
- 1
- 2
- 3
- 4
- 5

18. Which of the above symbols represents a positive proton or Anode?
- 1
- 2
- 3
- 4
- 5

19. Which of the above symbols represents a battery or direct current?
- 1
- 2
- 3
- 4
- 5

20. Magnets are surrounded by lines of force that are called flux.
- True
- False

21. As the current increases in a wire, the strength of the magnetic field _____.
- decreases
- does not change
- increases
- is not influenced by current flow

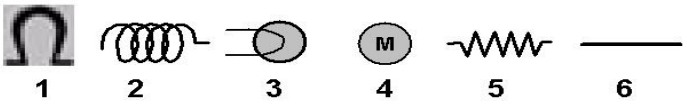
22. When a wire is moved through a magnetic field, electricity will begin flowing in the wire.
- True
- False

23. When generating electricity, an armature coil is needed because the coil is _____.
- a rotating loop of wire
- a stationary loop of wire
- a rotating magnet
- a stationary magnet

**Quiz 3:** ***WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. Which of the following is not a basic part of an electric circuit?
- Fuse
- Source of Power
- Load
- Switch
- Conductors

2. The units used to measure resistance are _____.
- Ohms
- Volts
- Amps




3. Which of these symbols represents OHMS?
- 1
- 2
- 3
- 4
- 5

4. Which of these symbols represents a MOTOR?
- 1
- 2
- 3
- 4
- 5

5. Which of these symbols represents a RESISTANCE HEATER?
- 1
- 2
- 3
- 4
- 5

6. Which of these symbols represents LIGHT?
- 1
- 2
- 3
- 4
- 5

- two separate paths
- three separate paths

7. In a series circuit, how many paths are there for current to flow?
- one path
8. In a Parallel circuit, how many paths are there for current to flow?
- one path
- two or more separate paths

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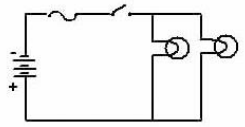
9. A series/parallel circuit is represented by illustration _____.
- 1
- 2
- 3

10. A parallel circuit is represented by illustration _____.
- 1
- 2
- 3

11. A series circuit is represented by illustration _____.
- 1
- 2
- 3

1



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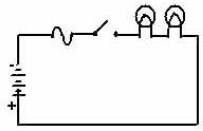

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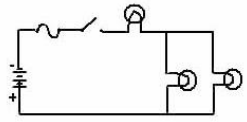

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12. A fuse is added to the circuit to help protect the other loads.
- True
- False

**Quiz 4:** ***WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. The major proven problem with the transmission of voltages over long distances is _____.
- transmission lines overheating
- resistance in the wire and resulting voltage drops
- obtaining right of way for access
- magnetic flux lines causing cancer
- vulnerability to terrorist attacks

2. After power is transmitted from the hydroelectric dam to your home, generally what is the electrical voltage coming into your home?
- 1300 volts
- 9 volts
- 240 volts
- 110 volts

3. The ground buss bar is labeled _____.
- A
- B
- C
- D
- E

4. The L1 buss bar is labeled _____.
- A
- B
- C
- D
- E

5. The 120v breaker is labeled _____.
- A
- C
- D
- E
- F

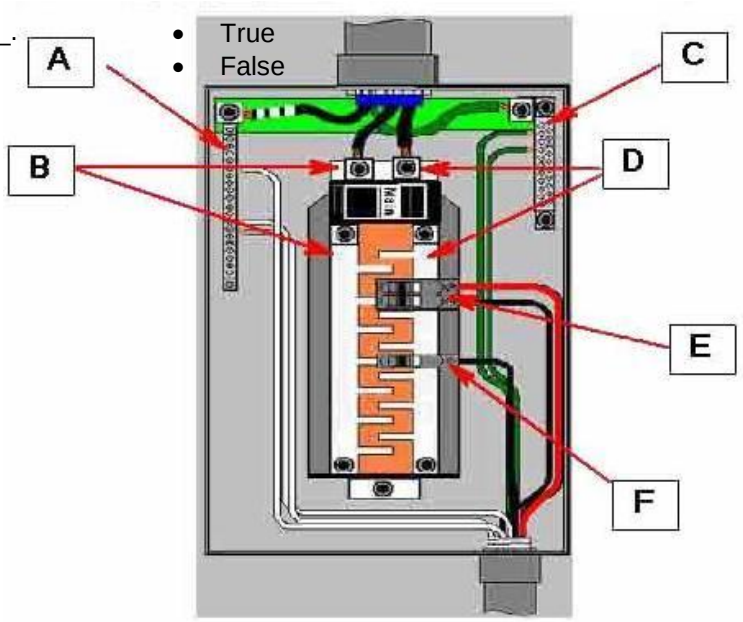
6. The L2 buss bar is labeled _____.
- A
- B
- C
- D
- E

7. The neutral buss bar is labeled _____.
- A
- B
- C
- D
- E

8. The 240v breaker is labeled _____.
- A
- B
- C
- D
- E

9. How many 120 volt legs enter a typical home's power panel?
- 1 leg
- 2 legs
- 3 legs

10. In a typical home's power panel, the ground buss and the neutral buss are connected.
- True
- False




11. It is good practice to remove the third or ground prong of a plug from an electric drill.
- True
- False

12. A 240-volt circuit breaker connects to a single 120-volt leg in typical homes in the power panel.
- True
- False

**Quiz 5 - *WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. Electrical potential is measured in _____.
- Ohms
- Volts
- Watts
- Amps
- none of the answers provided

2. In a water heater, cold water enters the tank at the _____.
- top
- middle
- bottom

3. In a water heater, the hot water is drawn from what section of the tank?
- top
- middle
- bottom

4. Using a volt meter, you will get a voltage reading when taking a measurement across an electrical power source.
- True
- False

5. Using a volt meter, you will get a voltage reading when taking a measurement across an electrical load.
- True
- False

6. When testing for resistance using a volt/Ohm meter while testing across an open switch (voltage disconnected), your reading will be O.L.
- True
- False

7. When testing a good closed switch, your reading will be O.L.
- True
- False

8. When testing resistance in a good heating element, you will get the following reading from your Volt/Ohm meter.
- O.L.
- Ohms
- Volts

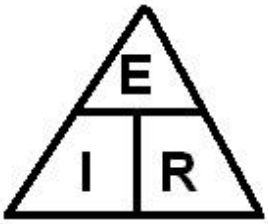
9. Water heaters with a rated circuit load in excess of 3,500 watts at 208 volts must use a wire no smaller than _____.
- 6 AWG
- 8 AWG
- 10 AWG
- 12 AWG
- 14 AWG

**Quiz 6 - *WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. In the formula for Ohms Law, what does the letter E stand for?
- Volts
- Ohms
- Amps

2. In the formula for Ohms Law, what does the letter I stand for?
- Volts
- Ohms
- Amps

3. In the formula for Ohms Law, what does the letter R stand for?
- Volts
- Ohms
- Amps




4. Using the above Ohms law formula, write the equation for finding Volts:
- E = I x R
- E = I / R
- E = R / I

5. Using the above Ohms law formula, write the equation for finding Current:
- I = E / R
- I = E x R
- I = R / E

6. Using the above Ohms law formula, write the equation for finding Resistance:
- R = E / I
- R = E x I
- R = I / E

7. E = 208 Volts, R = 121 Ohms, I = _____.
- 1.7 amps
- 0.58 amps
- 25.2 amps
- none of the answers provided

8. R = 10 Ohms, I = 48 Amps, V = _____.

- 2.08v
- 480v
- 208v
- 240v
- 120v

9. Voltage = 120 volts, Amps = 15, R = _____.
- 80 Ohms
- 8 Ohms
- 1800 Ohms
- none of the answers provided

**Quiz 7 *WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. Proper grounding is important so that _____.
- during a seismic ground shift, the equipment is stationary
- the equipment is always level and plumb
- the equipment does not move from the set location
- none of the answers provided

2. A green wire fastened to metal parts of equipment means _____.
- the metal parts are electrically connected
- the metal parts are part of the fan circuits
- the equipment and parts are environmentally safe
- none of the answers provided

3. The earth can be used as the only method of grounding conductors or ground fault current path.
- True
- False

4. A ground connection to a water pipe must be made within _____ of the entrance of the pipe to the building.
- 1 foot
- 3 feet
- 5 feet
- 8 feet
- 10 feet

**Quiz 8 *WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. A 12 AWG copper wire can generally be used to carry a maximum of _____.
- 10 amps
- 12 amps
- 16 amps
- 20 amps
- 30 amps

2. A 10 AWG copper wire can generally be used to carry a maximum of _____.
- 10 amps
- 12 amps
- 16 amps
- 20 amps
- 30 amps

3. By increasing the diameter of a wire, more electrons or increased amps, can flow without the buildup of excessive heat.
- True
- False

4. A standard plug fuse will fit in an S type fuse holder.
- True
- False

5. A standard plug fuse provides protection from high ampere levels and short-circuits.
- True
- False

6. The common rating of a circuit breaker is in _____.
- Volts
- Ohms
- arch corona rating
- Amps
- dielectric strength

7. This is an alternate term for Romex.
- RM
- NM
- MN
- None of the answers provided

8. When installing Romex, the minimum distance back from the face of the stud to the routing hole is _____.
- 1”
- 1-1/4”
- 1-1/2”
- 2”

9. When installing Romex on a wooden stud, no extra protection is needed if the cable is more than 1-1/4" from the face of the stud.
- True
- False

10. A protective nail plate should be at least _____ in thickness.
- 1/32 inches
- 1/16 inches
- 3/32 inches
- 1/8 inches

11. Romex must be supported within _____ of a box.
- 6 inches
- 8 inches
- 12 inches
- 16 inches

12. Romex must be supported at least every _____.
- 1 foot
- 3 feet
- 4-1/2 feet
- 6 feet
- 8 feet

13. When installing Romex in metal studs, it is not necessary to install protection for the cables in the holes.
- True
- False

14. Romex entering or exiting a power panel or junction box needs to be secured with cable clamps.
- True
- False

15. Romex may be installed in wet locations without conduit.
- True
- False

16. Romex is not UV sensitive and may be installed in situations exposed to sunlight.
- True
- False

**Quiz 9** ***WA Electricians: Answer all questions - 50% of the following will appear in random order with random answers -as required by WA LNI***

1. GFCI means _____.
- Ground Fault Circuit Interrupters
- Grounded Facility Circuit Interrupter
- Gross Fluctuation Capacitor Interaction
- None of the answers provided

2. The year that the National Electric Code mandated GFCI protection in houses was _____.
- 1993
- 1963
- 1973
- 2003

3. The purpose of a GFCI _____.
- conserves electricity by interrupting current flow
- automatically re-sets circuit when power is interrupted
- instantly interrupts current flow to prevent shock
- all of the answers provided

4. GFCI receptacles are required on all receptacles serving kitchen counter tops.
- True
- False

5. A GFCI receptacle is required for a dedicated circuit that only supplies power for a garbage disposal.
- True
- False

6. GFCI receptacles are required when installed in the garage.
- True
- False

7. If work is required on electrical equipment that has a fused disconnect box, what is the first step that should be done?
- Protect yourself and put the key to the lockout in your pocket.
- Turn the disconnect arm or lever to the off position.
- Check with a voltage pen to verify that power is off.
- Secure power to the electrical circuit by locking out the disconnect box.
- Remove the fuses from the disconnect box.

8. If work is required on electrical equipment that has a fused disconnect box, what is the second step that should be done?

- Protect yourself and put the key to the lockout in your pocket.
- Turn the disconnect arm or lever to the off position.
- Check with a voltage pen to verify that power is off.
- Secure power to the electrical circuit by locking out the disconnect box.
- Remove the fuses from the disconnect box.

9. If work is required on electrical equipment that has a fused disconnect box, what is the third step that should be done?
- Protect yourself and put the key to the lockout in your pocket.
- Turn the disconnect arm or lever to the off position.
- Check with a voltage pen to verify that power is off.
- Secure power to the electrical circuit by locking out the disconnect box.
- Remove the fuses from the disconnect box.

10. If work is required on electrical equipment that has a fused disconnect box, what is the fourth step that should be done?
- Protect yourself and put the key to the lockout in your pocket.
- Turn the disconnect arm or lever to the off position.
- Check with a voltage pen to verify that power is off.
- Secure power to the electrical circuit by locking out the disconnect box.
- Remove the fuses from the disconnect box.

11. If work is required on electrical equipment that has a fused disconnect box, what is the last step that should be done?
- Protect yourself by putting the key of your lock in your pocket.
- Turn the disconnect arm or lever to the off position.
- Check with a voltage pen to verify that power is off.
- Secure power to the electrical circuit by locking out the disconnect box.
- Remove the fuses from the disconnect box.

12. The 1st step in an electrical rescue is _____.
- to find the breaker or disconnect and turn the power off
- to find a dry non-conductive wooden or fiberglass handle or stick to remove the electrical wire from the victim
- to call 911 and then apply CPR if needed
- to cover with a blanket to help warm the victim if conscious or continue with CPR if unconscious

13. The 2nd step in an electrical rescue is _____.
- to find the breaker or disconnect and turn the power off
- to find a dry non-conductive wooden or fiberglass handle or stick to remove the electrical wire from the victim
- to call 911 and then apply CPR if needed
- to cover with a blanket to help warm the victim if conscious or continue with CPR if unconscious

14. The 3rd step in an electrical rescue is _____.
- to find the breaker or disconnect and turn the power off
- to find a dry non-conductive wooden or fiberglass handle or stick to remove the electrical wire from the victim
- to call 911 and then apply CPR if needed
- to cover with a blanket to help warm the victim if conscious or continue with CPR if unconscious

15. The 4th step in an electrical rescue is _____.
- to find the breaker or disconnect and turn the power off
- to find a dry non-conductive wooden or fiberglass handle or stick to remove the electrical wire from the victim
- to call 911 and then apply CPR if needed
- to cover with a blanket to help warm the victim if conscious or continue with CPR if unconscious

16. Metal ladders should be used while working with electricity.
- True
- False

17. Remove jewelry when working with electricity.
- True
- False