



HVAC

Flexible Instruction Day

Assignment #4

Learning Standard	Standard CC.3.5.11-12. B Determine the central ideas or conclusions of a text; etc.
Task # 601	Compare and analyze methods of producing electricity using appropriate terms.
Task # 603	Explain how magnetism is used in different HVAC components.

CONTACT INFORMATION/ASSISTANCE

Instructor Name: Mr. Collins/ Mr. Barnes

Instructor E-Mail:

collinse@butlertec.us barnesm@butlertec.us

We will be available by email from 7:40-12, and 12:30-3:10 to answer your questions. Please reach out if you are having difficulty completing your assignments.

INSTRUCTIONS

✓ All work is due on the day we return to school. This is counted towards your attendance **and** as a classroom assignment.

Please use Unit 12 Basic Electricity and Magnetism Part 1 Notes to complete the True and False Test. Each section of the packet has a section in the notes. For example, Atomic Theory would go along with Atomic Theory in the notes. You will have a hard copy of this and there is a copy on canvas.

Name: _____

Session: _____

____/____ points

Inclement Weather: Assignment 1

Basic Electricity

Name: _____ Session: _____ Date: _____

Please use Unit 12 Basic Electricity and Magnetism Part 1 Notes to complete the True and False Test. Each section of the packet has a section in the notes. For example, Atomic Theory would go along with Atomic Theory in the notes. You will have a hard copy of this and there is a copy on canvas.

Please note that this assignment will be part of your participation grade for the day. This needs to be returned completed the day of return. If this is not returned you will NOT receive your participation grade for the day. You will also be marked absent for the day if not completed.

_____ COMPLETE

_____ INCOMPLETE

Basic Electricity Guided Notes

NAME: _____ SESSION: _____ DATE: _____

Cengage: Refrigeration & Air Conditioning Technology

Unit 12: Basic Electricity and Magnetism

Pg. #284

True or False

12.1 Atomic Structure

- _____ 1. Matter is made up of atoms.
- _____ 2. The major components of an atom would be protons, neutrons, electrons.
- _____ 3. Protons and Electrons are in the nucleus of an atom.
- _____ 4. Protons and Electrons are equal in an atom.
- _____ 5. Copper has 25 Protons.
- _____ 6. "S" stands for Shell Number.
- _____ 7. Copper has one electron in the outermost orbit.
- _____ 8. A valence electron would be the electron in the outermost orbit.
- _____ 9. Metallic materials hold on to the electrons tightly.

12.2 The law of charges

- _____ 10. Energy or force need to be applied to free electrons.
- _____ 11. If an electron leaves an atom, the atom would become negatively charged.
- _____ 12. If an electron joins an atom, the atom would be positively charged.
- _____ 13. The Law of Charges states like charges repel each other and unlike charges attract each other.
- _____ 14. Two protons would repel each other.

Basic Electricity Guided Notes

12.3 Conductors

- _____ 15. A good conductor has multiple electrons in the outer orbit.
- _____ 16. Copper, Silver, and Gold are good conductors.
- _____ 17. The American Wire Gauge would give you good information on conductors.
- _____ 18. Thin wire is a better conductor.
- _____ 19. A good conductor of electricity would also be a good conductor of heat.

12.4 Insulators

- _____ 20. A good insulator doesn't allow free flow of electrons.
- _____ 21. Glass, Rubber, and Plastic would be good insulators.
- _____ 22. Metallic substances are good insulators.
- _____ 23. Non- Metallic substances are good conductors.

12.5 Electricity produced from magnetism

- _____ 24. Chemicals, Pressure, Light, Heat, and Magnetism are good ways to produce energy.
- _____ 25. Heating and cooling energy is produced by magnetism.
- _____ 26. There is three poles of a magnet.
- _____ 27. Magnetic fields cause fields of force.
- _____ 28. If a conductor is pushed through the fields of force, the electrons are freed.
- _____ 29. The difference in charge is called voltage or potential difference.
- _____ 30. Current is an impulse transferred from one electron to the next.
- _____ 31. Electromagnetic waves flow at a speed of 186,000,000 miles/seconds.
- _____ 32. Industrial generators use water flow, wind, or steam to create a magnetic field.

Basic Electricity Guided Notes

12.6 Current (Direct Current)

- _____ 33. Direct current flows in one direction.
- _____ 34. Direct Current flows from positive to negative.
- _____ 35. Batteries would be DC.
- _____ 36. To transfer DC to AC a rectifier would be used.

12.6 Current (Alternating Current)

- _____ 37. Current flows in waves and reverses its polarity.
- _____ 38. Alternating current would not be used today.

12.7 Units of electrical measurement

- _____ 39. EMF is created when a surplus builds up on one side of the circuit and a shortage on the other.
- _____ 40. The unit to measure force is volts.
- _____ 41. The unit that measures quantity is amps.
- _____ 42. 1 amp is equal to $\frac{1}{2}$ Coulombs.
- _____ 43. The unit to measure resistance is resistance.
- _____ 44. If current drops, resistance decreases.

Basic Electricity Guided Notes

12.8 The Basic Electrical circuit

- _____ 45. A circuit doesn't need a load.
- _____ 46. When using a light bulb, energy is only converted to light.
- _____ 47. A switch only closes a circuit.
- _____ 48. A closed switch allows current to flow.

12.9 Making electrical measurements

- _____ 49. A digital multimeter measures ohms, volt, and amps.
- _____ 50. The clamp on is used to measure intensity in a circuit.
- _____ 51. The current would flow through each load in a series circuit.
- _____ 52. The current would be divided through each load in a parallel circuit.
- _____ 53. A power passing device is a resistance or load.
- _____ 54. A power consuming device would be a switch.

12.10 Ohms law

- _____ 55. Ohms law is named after George S Ohm.
- _____ 56. George found ohms law by experimentation.
- _____ 57. E or V stands for Voltage (EMF)
- _____ 58. I stands for current/amps.
- _____ 59. R stands for resistance.
- _____ 60. $R_T = R_1 + R_2 + R_3$ is the formula for parallel circuits.

Basic Electricity Guided Notes

12.11 Characteristics of series circuits

- _____ 61. The voltage will not be equal to the sum of the voltages.
- _____ 62. $E_T = E_1 + E_2 + E_3$ is the formula for volts in a series circuit
- _____ 63. $I_T = I_1 + I_2 + I_3$ is the formula for current in a series circuit.
- _____ 64. $E_T = E_1 = E_2 = E_3$ is the voltage formula for parallel
- _____ 65. $R_T = 1 / (1/R_1 + 1/R_2 + 1/R_3)$ is the resistance formula for series.

12.13 electrical power

- _____ 66. Volts is electrical power (p).
- _____ 67. A watt is the amount of power used when 1 ampere flows with a potential difference of 1 volt.
- _____ 68. The formula for power is $P = E \cdot I$
- _____ 69. The formula for kilowatts is $P \text{ (in KW)} = (E \cdot I) / 1000$

12.14 Magnetism

- _____ 70. A wire that is coiled effects magnetic field.
- _____ 71. A solenoid is a coil of wire carrying electrical current.
- _____ 72. The only thing a magnetic field could be used for is generating electricity.

12.15 Inductance

- _____ 73. Inductive reactance is an emf or voltage that is strong enough to provide an opposition to the existing voltage.
- _____ 74. Electric motors are resistive loads.
- _____ 75. Lightbulbs are inductive loads.

Basic Electricity Guided Notes

12.16 Transformers

- _____ 76. A transformer is an electrical device that produces a voltage in a second circuit through electromagnetic induction.
- _____ 77. If voltage is produced across the primary winding of the transformer, a voltage wouldn't be produced across the secondary winding.
- _____ 78. A step up transformer has more windings in the primary winding.
- _____ 79. A step down transformer has more turns of wire in the secondary winding.

12.19 Electrical Measuring instruments

- _____ 80. A digital multimeter measures voltage, current, resistance, and always temperature.
- _____ 81. A function switch allows the user to set the electrical characteristics that is being measured.
- _____ 82. A range switch allows the user to enter the reading that it should be.
- _____ 83. Voltage is checked in AC by test leads connected across each load.
- _____ 84. A clamp-on ammeter is being clamped around wires in each circuit.
- _____ 85. Electrical troubleshooting is performed one step at a time.
- _____ 87.

