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| **Ref.** | **Unit 1 Concepts & Definitions** | **Terms, Notation, Formulas, Diagrams** |
|  | Electricity is the flow of:  | Electric Charge |
|  | Three types of materials commonly used in electrical systems are - | Conductors, Insulators, Semiconductors |
|  | The standard model in which electrons configure themselves into shells around a nucleus is called the - | Bohr Model |
|  | The ability of a material to conduct electricity depends on … electrons in the outer shell called -  | Valence Electrons |
|  | Fewer valence electrons make a material more -  | Conductive |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is opposite the flow of electrons and goes from + to - . | Conventional Current ($I$) |
|  | The net flow of electrons through a material is called -  | Electron Current |
|  | Electrical **resistance (R)** is a measure of a material’s opposition to the passage of -  | Electric Current (I) |
|  | The potential difference between the strength of the electron supply and the electron shortage defines the \_\_\_\_, a.k.a. the electromotive force. | Voltage (V or E) |
|  | Electric current or voltage that periodically reverses direction is called -  | Alternating Current (AC) Voltage |
|  | Typical AC voltage in the U.S. is -  | 120 Volts |
|  | Electrical current or voltage that is constant is called -  | Direct Current (DC) Voltage |
|  | A \_\_\_\_ (also bus bar) is a metallic strip or bar, typically housed inside switchgear, panel boards, and busway enclosures for local high current power distribution. | Power Bus |
|  | In (DC) electronics, wires carrying supply power (+) are typically -  | Red |
|  | In (DC) electronics, ground (-) wires are typically -  | Black |
|  | An electronic \_\_\_\_\_\_\_\_\_\_\_\_ is used to connect wires and components in prototype circuits. | Breadboard |
|  | The red bus closest to the Arduino breadboard in our kit provides \_\_\_\_ regulated. | 5 Volts |
|  | The yellow wire, connected to Vin and the red bus farthest from the Arduino circuit board, is used for Vin which provides \_\_\_\_\_\_\_\_ unregulated. | 9 Volts |
|  | A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a hand-held piece of electrical test equipment used to make a variety of electrical measurements. | Digital Multimeter (DMM) |
|  | Test \_\_\_\_\_\_\_\_\_\_\_\_\_ are connected to electrical test equipment and used to take measurements across components in a circuit. | Probes |
|  | Electric current, I, is the amount of charge passing a point per unit time and is measures in -  | Amperes (Amps), where $1A=1\frac{Coulomb}{second}$ |
|  | A \_\_\_\_\_\_\_\_\_ is equal the amount of charge in $6.24×10^{18}electrons$. | Coulomb (C) |
|  | Voltage is the measure of the amount of potential energy per electric charge or Coulomb, so -  | $$1V= \frac{Energy}{Electric Charge}=\frac{J}{C}$$ |
|  | \_\_\_\_\_\_\_\_\_\_\_\_ is a measure of work (in Joules). | Energy |
|  | Work =  | $$V\left(\frac{J}{C}\right)∙C=J$$ |
|  | Resistance(R) is a measure of the frictional resistance encountered by electrons as they attempt to pass through a material measured in -  | Ohms $\left(Ω\right)$ |
|  | A \_\_\_\_\_\_\_\_\_\_\_ is a closed path in which current can flow. | Circuit |
|  | Ohm’s Law relates voltage, current, & resistance to each other using the equation -  | $$V=IR$$ |
|  | Electricity can flow one way through a –  | (Light Emitting) Diode (LED) |
|  | Power =  | $$\frac{Work}{Time}=\frac{J}{s}=Watt(W)$$ |
|  | Power Equation: | $$P=IV$$ |
|  | Combining $P=IV$ and $V=IR$, we get: | $$P=I^{2}R$$ |