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with electricity we measure the amount of charge flowing through the circuit over a period of time current is measured in amperes usually just referred to as amps an ampere is defined as  $6.241 \times 10^{18}$  electrons 1 coulomb per second passing through a point in a circuit voltage and current are the cornerstone concepts in electricity we will create our first mental models for these basic electrical quantities we will also talk about power which is what happens when voltage and current act together current in the realm of electrical circuits refers to the flow of electric charge through a conductor it is the rate at which electrons move along a closed path commonly a wire or circuitry measured in amperes a current is a fundamental concept in understanding the dynamic behavior of electricity electricity is the flow of electric charge which in most household contexts means the movement of electrons through a conductor these electrons move from areas of negative charge to areas of positive charge creating an electric current an electrical conduit is a metal or plastic pipe through which electrical wires are run available in either rigid or flexible forms a conduit protects the wires and is used in exposed locations such as along the exterior surface of a wall as well as in unfinished areas like basements crawlspaces and attics and in surface mounted chapter 1 basic concepts of electricity conductors insulators and electron flow pdf version the electrons of different types of atoms have different degrees of freedom to move around electrical signals cause various ions dissolved in the salt water to rapidly migrate into different parts of each nerve cell which in turn creates new electric fields that move around the ions in the next nerve cell down the line neurons communicate with each other through electrical and chemical signals explains barak the electrical signal or action potential runs from the cell body area to the axon terminals through a thin fiber called axon some of these axons can be very long and most of them are very short electrons and ions in insulators are bound in the structure and cannot move easily as much as  $10^{23}$   $10^{23}$  times more slowly than in conductors pure water and dry table salt are insulators for example whereas molten salt and salty water are conductors electric charge comes in two varieties which we call positive and negative like charges repel each other and unlike charges attract each other thus two positive charges repel each other as do two negative charges a positive charge and a negative charge attract each other how do we know there are two types of electric charge a conductor is a material that allows electrons to flow freely through it making it useful for carrying electric current an insulator is a material that resists the flow of electrons so it does not allow electric current to pass through it learn about how conductors and insulators work and how they are effected by changes in electrical current electricity is the term we use to describe the energy of charged particles electricity might be stored like in a battery when you connect a battery to a light bulb electricity flows this happens because electrical charges electrons are free to carry energy from the battery through the bulb by the end of this section you will be able to express electrical power in terms of the voltage and the current describe the power dissipated by a resistor in an electric circuit calculate the energy efficiency and cost effectiveness of appliances and equipment electric potential is potential energy per unit charge the potential difference between points a and b  $v_b - v_a$  that is the change in potential of a charge q moved from a to b is equal to an electric circuit includes a device that gives energy to the charged particles constituting the current such as a battery or a generator devices that use current

such as lamps electric motors or computers and the connecting wires or transmission lines electricity is the movement of electrons between atoms electrons usually remain a constant distance from the atom s nucleus in precise shells the shell closest to the nucleus can hold two electrons the next shell can hold up to eight the outer shells can hold even more the curriculum for the doctoral program is based on the advanced specialized knowledge of electrical and electronic engineering acquired and creative skills developed in the master s program its structure allows many new skills to be obtained while developing those that have already been acquired the final rule reflects more than 15 000 pages of comments from nearly 200 stakeholders representing all sectors of the electric power industry environmental consumer and other advocacy groups and state and other government entities the department of electrical electronics and communication engineering will explore even more effective uses and new possibilities of communication network technologies and information processing technologies

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