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The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Semiconductors are materials that have electrical conductivity between that of a conductor (like metals) and an insulator (like ceramics). Their conductivity can be changed by adding impurities or by changing temperature, making them essential for electronic devices like transistors, diodes, and integrated circuits.Let's examine the given options to determine which one is not a semiconductor. Analyzing the Options Silicon (Si): Silicon is a chemical element in Group 14 of the periodic table. It is one of the most widely used semiconductor materials. Its electrical conductivity is intermediate between that of a conductor and an insulator, and it exhibits semiconducting properties. Krypton (Kr): Krypton is a chemical element in Group 18 of the periodic table. Elements in Group 18 are known as noble gases. Noble gases have a stable electron configuration, which makes them very unreactive and poor conductors of electricity. They are typically insulators, not semiconductors. Selenium (Se): Selenium is a chemical element in Group 16 of the periodic table. It is known to exhibit semiconducting properties, especially in certain forms. Selenium's conductivity increases significantly when exposed to light, a property used in photocells and exposure meters. Germanium (Ge): Germanium is a chemical element also in Group 14, like Silicon. It is another classic semiconductor material, widely used in early semiconductor devices. Like Silicon, its electrical properties fall between conductors and insulators. ConclusionBased on the properties of these elements, Silicon, Selenium, and Germanium are all recognized semiconductors. Krypton, being a noble gas, is an insulator and does not exhibit semiconducting behavior. Identifying the Non-Semiconductor ElementThe question asks which of the listed options is not a semiconductor. By examining the properties of each element: Silicon: Semiconductor Krypton: Insulator (Not a semiconductor) Selenium: Semiconductor Germanium: SemiconductorTherefore, Krypton is the element that is not a semiconductor among the given options. Revision Table: Semiconductor Properties Element Symbol Group Classification Semiconductor? Silicon Si 14 Metalloid Yes Krypton Kr 18 Noble Gas No (Insulator) Selenium Se 16 Nonmetal Yes Germanium Ge 14 Metalloid Yes Additional Information on SemiconductorsSemiconductors are crucial materials in modern technology. Their conductivity (σ in S/cm) is typically in the range of 10^{-8} to 10^{-38} S/cm , which is between that of insulators ($\sigma < 10^{-10}$ S/cm) and conductors ($\sigma > 10^{-4}$ S/cm).Pure semiconductors (intrinsic semiconductors) have limited conductivity. Their conductivity can be significantly increased and controlled through a process called doping, where small amounts of impurities are added. This creates extrinsic semiconductors, which are either n-type (excess electrons) or p-type (excess holes).Common semiconductor elements include Silicon (Si), Germanium (Ge), Selenium (Se), and Tellurium (Te). Compound semiconductors, formed from two or more elements, are also widely used, such as Gallium Arsenide (GaAs), Indium Phosphide (InP), and Cadmium Sulfide (CdS). Technology Engineering Mechanical Engineering semiconductor device, electronic circuit component made from a material that is neither a good conductor nor a good insulator (hence semiconductor). Such devices have found wide applications because of their compactness, reliability, and low cost. As discrete components, they have found use in power devices, optical sensors, and light emitters, including solid-state lasers. They have a wide range of current- and voltage-handling capabilities, with current ratings from a few nanoamperes (109 ampere) to more than 5,000 amperes and voltage ratings extending above 100,000 volts. More importantly, semiconductor devices lend themselves to integration into complex but readily manufacturable microelectronic circuits. They are, and will be in the foreseeable future, the key elements for the majority of electronic systems, including communications, consumer, data-processing, and industrial-control equipment. Solid-state materials are commonly grouped into three classes: insulators, semiconductors, and conductors. (At low temperatures some conductors, semiconductors, and insulators may become superconductors.) Figure 1 shows the conductivities (and the corresponding resistivities = 1/) that are associated with some important materials in each of the three classes. Insulators, such as fused quartz and glass, have very low conductivities, on the order of 1018 to 1010 siemens per centimetre; and conductors, such as aluminum, have high conductivities, typically from 104 to 106 siemens per centimetre. The conductivities of semiconductors are between these extremes. The conductivity of a semiconductor is generally sensitive to temperature, illumination, magnetic fields, and minute amounts of impurity atoms. For example, the addition of less than 0.01 percent of a particular type of impurity can increase the electrical conductivity of a semiconductor by four or more orders of magnitude (i.e., 10,000 times). The ranges of semiconductor conductivity due to impurity atoms for five common semiconductors are given in Figure 1.The study of semiconductor materials began in the early 19th century. Over the years, many semiconductors have been investigated. The table shows a portion of the periodic table related to semiconductors. The elemental semiconductors are those composed of single species of atoms, such as silicon (Si), germanium (Ge), and gray tin (Sn) in column IV and selenium (Se) and tellurium (Te) in column VI. There are, however, numerous compound semiconductors that are composed of two or more elements. Gallium arsenide (GaAs), for example, is a binary III-V compound, which is a combination of gallium (Ga) from column III and arsenic (As) from column V.Portion of the periodic table of elements related to semiconductorsperiod column II III IV V VI 2 boronB carbonC nitrogenN 3 magnesiumMg aluminumAl siliconSi phosphorusP sulfurS 4 zincZn galliumGa germaniumGe arsenicAs seleniumSe 5 cadmiumCd indiumIn tinSn antimonySb telluriumTe 6 mercuryHg leadPb Ternary compounds can be formed by elements from three different columns, as, for instance, mercury indium telluride (HgIn2Te4), a II-III-VI compound. They also can be formed by elements from two columns, such as aluminum gallium arsenide (AlxGa1-xAs), which is a ternary III-V compound, where both Al and Ga are from column III and the subscript x is related to the composition of the two elements from 100 percent Al (x = 1) to 100 percent Ga (x = 0). Pure silicon is the most important material for integrated circuit application, and III-V binary and ternary compounds are most significant for light emission.Prior to the invention of the bipolar transistor in 1947, semiconductors were used only as two-terminal devices, such as rectifiers and photodiodes. During the early 1950s, germanium was the major semiconductor material. However, it proved unsuitable for many applications, because devices made of the material exhibited high leakage currents at only moderately elevated temperatures. Since the early 1960s, silicon has become a practical substitute, virtually supplanting germanium as a material for semiconductor fabrication. The main reasons for this are twofold: (1) silicon devices exhibit much lower leakage currents, and (2) high-quality silicon dioxide (SiO2), which is an insulator, is easy to produce. Silicon technology is now by far the most advanced among all semiconductor technologies, and silicon-based devices constitute more than 95 percent of all semiconductor hardware sold worldwide.Many of the compound semiconductors have electrical and optical properties that are absent in silicon. These semiconductors, especially gallium arsenide, are used mainly for high-speed and optoelectronic applications. semiconductor bondsThree bond pictures of a semiconductor.The semiconductor materials treated here are single crystals,i.e., the atoms are arranged in a three-dimensional periodic fashion. Figure 2A shows a simplified two-dimensional representation of an intrinsic silicon crystal that is very pure and contains a negligibly small amount of impurities. Each silicon atom in the crystal is surrounded by four of its nearest neighbours. Each atom has four electrons in its outer orbit and shares these electrons with its four neighbours. Each shared electron pair constitutes a covalent bond. The force of attraction for the electrons by both nuclei holds the two atoms together.At low temperatures the electrons are bound in their respective positions in the crystal; consequently, they are not available for electrical conduction. At higher temperatures thermal vibration may break some of the covalent bonds. The breaking of a bond yields a free electron that can participate in current conduction. Once an electron moves away from a covalent bond, there is an electron deficiency in that bond. This deficiency may be filled by one of the neighbouring electrons, which results in a shift of the deficiency location from one site to another. This deficiency may thus be regarded as a particle similar to an electron. This fictitious particle, dubbed a hole, carries a positive charge and moves, under the influence of an applied electric field, in a direction opposite to that of an electron.For an isolated atom, the electrons of the atom can have only discrete energy levels. When a large number of atoms are brought together to form a crystal, the interaction between the atoms causes the discrete energy levels to spread out into energy bands. When there is no thermal vibration (i.e., at low temperature), the electrons in a semiconductor will completely fill a number of energy bands, leaving the rest of the energy bands empty. The highest filled band is called the valence band. The next higher band is the conduction band, which is separated from the valence band by an energy gap. This energy gap, also called a bandgap, is a region that designates energies that the electrons in the semiconductor cannot possess. Most of the important semiconductors have bandgaps in the range 0.25 to 2.5 eV. The bandgap of silicon, for example, is 1.12 eV and that of gallium arsenide is 1.42 eV.As discussed above, at finite temperatures thermal vibrations will break some bonds. When a bond is broken, a free electron, along with a free hole, results, i.e., the electron possesses enough thermal energy to cross the bandgap to the conduction band, leaving behind a hole in the valence band. When an electric field is applied to the semiconductor, both the electrons in the conduction band and the holes in the valence band gain kinetic energy and conduct electricity. The electrical conductivity of a material depends on the number of charge carriers (i.e., free electrons and free holes) per unit volume and on the rate at which these carriers move under the influence of an electric field. In an intrinsic semiconductor there exists an equal number of free electrons and free holes. The electrons and holes, however, have different mobilities that is to say, they move with different velocities in an electric field. For example, for intrinsic silicon at room temperature, the electron mobility is 1,500 square centimetres per volt second (cm2/Vs)i.e., an electron will move at a velocity of 1,500 centimetres per second under an electric field of one volt per centimetrewwhile the hole mobility is 500 cm2/Vs. The mobilities of a given semiconductor generally decrease with increasing temperature or with increased impurity concentration.Electrical conduction in intrinsic semiconductors is quite poor at room temperature. To produce higher conduction, one can intentionally introduce impurities (typically to a concentration of one part per million host atoms). This is the so-called doping process. For example, when a silicon atom is replaced by an atom with five outer electrons such as arsenic (Figure 2C), four of the electrons form covalent bonds with the four neighbouring silicon atoms. The fifth electron becomes a conduction electron that is donated to the conduction band. The silicon becomes an n-type semiconductor because of the addition of the electron. The arsenic atom is the donor. Similarly, Figure 2C' shows that, when an atom with three outer electrons such as boron is substituted for a silicon atom, an additional electron is accepted to form four covalent bonds around the boron atom, and a positively charged hole is created in the valence band. This is a p-type semiconductor, with the boron constituting an acceptor. The Correct Option is BSolution and ExplanationStep 1: Silicon (Si) and Germanium (Ge) are well-known semiconductors commonly used in electronics.Step 2: Cadmium Sulfide (CdS) and Gallium Arsenide (GaAs) are compound semiconductors used in various electronic and photonic devices.Step 3: Antimony (Sb), however, is a metalloid and is typically not classified as a semiconductor; it does not exhibit the semiconductive properties like variable conductivity or bandgap manipulation typical of semiconductor materials.Step 4: Therefore, Sb is not a semiconductor, correctly aligning with option (B).AnswerVerifiedHint: Semiconductors are the materials which have a conductivity between conductors (generally metals) and non-conductors or insulators. They generally work due to imbalance of electrons that carry negative charge.Complete step by step answer:In 1874, Karl Braun discovered and documented the first semiconductor diode effect. He observed that the current flows freely in only one direction and further in 1901, the very first semiconductor device known as cat whiskers was patented.Generally, these are the materials which have a conductivity between conductors and insulators. Some of the examples of semiconductors are germanium, silicon etc. Now, lets discuss the conduction band and valence band in semiconductors.Basically, the energy band involving the energy levels of valence electrons is known as valence band. As compared to insulators, the band gap in semiconductors is smaller. It further allows the electrons in the valence band to jump into the conduction band whereas conduction band is the lowest unoccupied band that includes the energy levels of positive or negative charge carriers. In semiconductors, this band accepts the electrons from the valence band. The energy level diagram is as shown: Now, among the given options Gold is not a semiconductor. It is a noble metal and is a good conductor of heat and electricity. The usage of gold is avoided in semiconductor technology because it acts like a deep level trap and recombination center.Hence, option C is correct.Note: Semiconductors are used in almost all the electronic devices. Their reliability, compactness, low cost makes them ideal to be used for various purposes in a wide range of components and devices. Moreover, transistors, diodes, photo sensors and much more devices are made up of semiconductors. Free 20 Questions 20 Marks 20 Mins Semiconductor: A semiconductor is a substance that has a resistivity in between conductor and insulator. A semiconductor has 4 valance electrons that are C, Si, Ge, Sn, and Pb. Classification of Semiconductor: Intrinsic Semiconductor: An extremely pure form is known as an Intrinsic Semiconductor. In intrinsic Semiconductor, even at room temperature, hole electrons pair are created. Electric fields applied across the intrinsic semiconductor cause current conduction due to both Holes as well as Electrons. Extrinsic Semiconductor: The process of adding impurity to the pure semiconductor is called Doping. By means of doping Extrinsic semiconductor is formed. Normally, 108atoms of semiconductor added with 1 atom of impurity. Depending upon the types of impurity added, the extrinsic semiconductor is classified into N-type and P-Type semiconductors. 1. N-Type Semiconductor: This type of semiconductor is formed by added pentavalent impurity. Pure Semiconductor C Si Ge Sn Pb Trivalent Impurity B Al Ga In Tl The current conduction in the P-Type semiconductor is predominantly by holes or it has hole-type conductivity. Conclusion: Hence,Micanite is not a semiconductor. Indias #1 Learning Platform Start Complete Exam Preparation Daily Live MasterClasses Practice Question Bank Mock Tests & Quizzes Trusted by 7.3 Crore+ Students

Which semiconductor device is normally on. Which semiconductor device is not a current triggering device. Which is not semiconductor. Which of the following is not a minority carrier semiconductor device. Choose the component which is not a semiconductor device. Which is not a semiconductor company. Why c is not a semiconductor. Which of the following is not a semiconductor device.

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