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https://www.100test.com/kao_ti2020/159/2021_2022_07_E6_8C_87_E5_AF_BC_E6_AF_c70_159954.htm Passage Twenty-eight (Chemistry and Biology)About a century ago, the Swedish physical scientist Arrhenius proposed a low of classical chemistry that relates chemical reaction rate to temperature. According to his equation, chemical reactions are increasingly unlikely to occur as temperature approaches absolute zero, and at absolute zero, reactions stop. However, recent experiment evidence reveals that although the Arrhenius equation is generally accurate in describing the kind of chemical reaction that occurs at relatively high temperature, at temperatures closer to zero a quantum-mechanical effect known as tunneling comes into play. this effect accounts for chemical reactions that are forbidden by the principles of classical chemistry. Specifically, entire molecules can tunnel through the barriers of repulsive forces from other molecules and chemically react even though these molecules do not have sufficient energy, according to classical chemistry, to overcome the repulsive barrier.The rate of any chemical reaction, regardless of the temperature at which it takes place, usually depends on a very important characteristic known as its activation energy. Any molecule can be imagined to reside at the bottom of a so-called potential well of energy. S chemical reaction corresponds to the transition of a molecule from the bottom of one potential well to the bottom of another. In classical chemistry, such a transition can be accomplished only by going over the potential barrier between the well, the height of which remain constant and is called the activation energy of the reaction. In tunneling, the reacting molecules tunnel from the bottom of one to the bottom of another well without having to rise over the barrier between the two wells. Recently researchers have developed the concept of tunneling temperature: the temperature below which tunneling transitions greatly outnumber Arrhenius transitions, and classical mechanics gives way to its quantum counterpart.This tunneling phenomenon at very low temperatures suggested my hypothesis about a cold prehistory of life: formation of rather complex organic molecules in the deep cold of outer space, where temperatures usually reach only a few degrees Kelvin. Cosmic rays might trigger the synthesis of simple molecules, such as interstellar formaldehyde, in dark clouds of interstellar dust. Afterward complex organic molecules would be formed, slowly but surely, by means of tunneling. After I offered my hupothesis, Hoyle and Wickramashinghe argued that molecules of interstellar formaldehyde have indeed evolved into stable polysaccharides such as cellulose and starch. Their conclusions, although strongly disputed, have generated excitement among investigators such as myself who are proposing that the galactic clouds are the places where the prebiological evolution of compounds necessary to life occurred. 1. The author is mainly concerned with [A]. describing how the principles of classical chemistry were developed.[B]. [B]. initiating a debate about the kinds of chemical reaction required for the development of life.[C]. [C].explaining how current research in chemistry may be related to broader biological concerns.[D]. clarifying inherent ambiguities in the laws of classical chemistry. 2. In which of the following ways are the mentioned chemical reactions and tunneling reactions alike?[A]. In both, reacting molecules have to rise over the barrier between the two wells.[B]. [B]. In both types of reactions, a transition is made from the bottom of one potential well to the bottom of another.[C]. [C].In both types of reactions, reacting molecules are able to go through the barrier between the two wells.[D]. [D]. In neither type of reaction does the rate of a chemical reaction depend on its activation energy. 3. The author ’ s attitude toward the theory of a cold prehistory of life can best be described as[A]. neutral. [B]. skeptical.[C]. mildly positive. [D]. very supportive. 4. Which of the following best describes the hypothesis of Hoyle and Wickramasinghe?[A]. Molecules of interstellar formaldehyde can evolve into complex organic molecules.[B]. Interstellar formaldehyde can be synthesized by tunneling.[C]. Cosmic rays can directly synthesize complex organic molecules.[D]. [D].The galactic clouds are the places where prebilogical evolution of compounds necessary to life occurred. Vocabulary1. Arrhenius equation 阿雷尼厄斯方程式2. Arrhennius (Svante August) 18591927 瑞典理化学家。1903年获诺贝尔化学奖3. quantum-mechanical effect 量子机械效应4. quantum mechanic 量子力学5. tunnel 挖隧道。这里指贯穿势垒6. tunnel through, onto 穿到……进到，贯穿7. repulsive 排斥8. activation energy 活化能量9. formaldehyde 甲醛10. polysaccharide 多糖醇，聚合酶11. cellulose 纤维素12. starch 淀粉13. galactic 银河的，巨大的14. come into play 开始活动/起作