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https://www.100test.com/kao_ti2020/126/2021_2022_GMAT_E9_98_85_E8_AF_BB_c89_126564.htm Passage 1 Virtually everything astronomers known about objects outside the solar system is based on the detection of photons-quanta of electromagnetic radiation. Yet there is another form of radiation that permeates the universe： （5） neutrinos. With （as its name implies） no electric charge， and negligible mass， the neutrino interacts with other particles so rarely that a neutrino can cross the entire universe， even traversing substantial aggregations of matter， without being absorbed or even deflected. Neu- （10） trinos can thus escape from regions of space where light and other kinds of electromagnetic radiation are blocked by matter. Furthermore， neutrinos carry with them information about the site and circumstances of their production： therefore， the detection of cosmic neutrinos （15） could provide new information about a wide variety of cosmic phenomena and about the history of the uni- verse. But how can scientists detect a particle that interacts so infrequently with other matter？ Twenty-five years （20） passed between Paulis hypothesis that the neutrino existed and its actual detection： since then virtually all research with neutrinos has been with neutrinos created artificially in large particle accelerators and studied under neutrino microscopes. But a neutrino telescope， （25） capable of detecting cosmic neutrinos， is difficult to co- nstruct. No apparatus can detect neutrinos unless it is extremely massive， because great mass is synonymous with huge

numbers of nucleons （neutrons and protons）， and the more massive the detector， the greater the pro- （30） bability of one of its nucleons reacting with a neutrino. In addition， the apparatus must be sufficiently shielded from the interfering effects of other particles. Fortunately， a group of astrophysicists has proposed a means of detecting cosmic neutrinos by harnessing the （35） mass of the ocean. Named DUMAND， for Deep Under- water Muon and Neutrino Detector， the project calls for placing an array of light sensors at a depth of five kilo- meters under the ocean surface. The detecting medium is the seawater itself： when a neutrino interacts with a （40） particle in an atom of seawater， the result is a cascade of electrically charged particles and a flash of light that can be detected by the sensors. The five kilometers of sea- water above the sensors will shield them from the interf- ering effects of other high-energy particles raining down （45） through the atmosphere. The strongest motivation for the DUMAND project is that it will exploit an important source of information about the universe. The extension of astronomy from visible light to radio waves to x-rays and gamma rays （50） never failed to lead to the discovery of unusual objects such as radio galaxies， quasars， and pulsars. Each of these discoveries came as a surprise. Neutrino astronomy will doubtless bring its own share of surprises. 1. Which of the following titles best summarizes the passage as a whole？ （A） At the Threshold of Neutrino Astronomy （B） Neutrinos and the History of the Universe （C） The Creation and Study of Neutrinos （D） The DUMAND System and How It Works （E） The

Properties of the Neutrino 2. With which of the following statements regarding neutrino astronomy would the author be most likely to agree？ （A） Neutrino astronomy will supersede all present forms of astronomy. （B） Neutrino astronomy will be abandoned if the DUMAND project fails. （C） Neutrino astronomy can be expected to lead to major breakthroughs in astronomy. （D） Neutrino astronomy will disclose phenomena that will be more surprising than past discoveries. （E） Neutrino astronomy will always be characterized by a large time lag between hypothesis and experimental confirmation. 3. In the last paragraph， the author describes the development of astronomy in order to （A） suggest that the potential findings of neutrino astronomy can be seen as part of a series of astronomical successes （B） illustrate the role of surprise in scientific discovery （C） demonstrate the effectiveness of the DUMAND apparatus in detecting neutrinos （D） name some cosmic phenomena that neutrino astronomy will illuminate （E） contrast the motivation of earlier astronomers with that of the astrophysicists working on the DUMAND project 