Science and Technology Based Reading Comprehension

PASSAGE 1

Australian researchers have discovered electroreceptors clustered at the tip of the spiny anteater's snout. The researchers made this discovery by exposing small areas of the snout to extremely weak electrical fields and recording the transmission of resulting nervous activity to the brain. While it is true that tactile receptors, another kind of sensory organ on the anteater's snout, can also respond to electrical stimuli, such receptors do so only in response to electrical field strengths about 1,000 times greater than those known to excite electroreceptors.

Having discovered the electroreceptors, researchers are now investigating how anteaters utilize such a sophisticated sensory system. In one behavioral experiment, researchers successfully trained an anteater to distinguish between two troughs of water, one with a weak electrical field and the other with none. Such evidence is consistent with researchers' hypothesis that anteaters use electroreceptors to detect electrical signals given off by prey; however, researchers as yet have been unable to detect electrical signals emanating from termite mounds, where the favorite food of anteaters live. Still, researchers have observed anteaters breaking into a nest of ants at an oblique angle) and quickly locating nesting chambers. This ability quickly to locate unseen prey suggests, according to the researchers, that the anteaters were using their electroreceptors to locate the nesting chambers.

1) According to the passage, which of the following is a characteristic that distinguishes electroreceptors from tactile receptors?
- A. The manner in which electroreceptors respond to electrical stimuli
- B. The tendency of electroreceptors to be found in clusters
- C. The unusual locations in which electroreceptors are found in most species
- D. The amount of electrical stimulation required to excite electroreceptors
- E. The amount of nervous activity transmitted to the brain by electroreceptors when they are excited

2) Which of the following can be inferred about the experiment described in the first paragraph?
- A. Researchers had difficulty verifying the existence of electroreceptors in the anteater because electroreceptors respond to such a narrow range of electrical field strengths.
- B. Researchers found that the level of nervous activity in the anteater's brain increased dramatically as the strength of the electrical stimulus was increased.
- C. Researchers found that some areas of the anteater's snout were not sensitive to a weak electrical stimulus.
- D. Researchers found that the anteater's tactile receptors were more easily excited by a strong electrical stimulus than were the electroreceptors.
- E. Researchers tested small areas of the anteater's snout in order to ensure that only electroreceptors were responding to the stimulus.

3) The author of the passage most probably discusses the function of tactile receptors in order to
- A. eliminate and alternative explanation of anteaters' response to electrical stimuli
- B. highlight a type of sensory organ that has a function identical to that of electroreceptors
- C. point out a serious complication in the research on electroreceptors in anteaters
- D. suggest that tactile receptors assist electroreceptors in the detection of electrical signals
- E. introduce a factor that was not addressed in the research on electroreceptors in anteaters

4) Which of the following can be inferred about anteaters from the behavioral experiment mentioned in the second paragraph?
- A. They are unable to distinguish between stimuli detected by their electroreceptors and stimuli detected by their tactile receptors.
- B. They are unable to distinguish between the electrical signals emanating from termite mounds and those emanating from ant nests.
- C. They can be trained to recognize consistently the presence of a particular stimulus.
- D. They react more readily to strong than to weak stimuli.
- E. They are more efficient at detecting stimuli in a controlled environment than in a natural environment.

5) The passage suggests that the researchers mentioned in the second paragraph who observed anteaters break into a nest of ants would most likely agree with which of the following statements?
- A. The event they observed provides conclusive evidence that anteaters use their electroreceptors to locate unseen prey.
- B. The event they observed was atypical and may not reflect the usual hunting practices of anteaters.
- C. It is likely that the anteaters located the ants' nesting chambers without the assistance of electroreceptors.
- D. Anteaters possess a very simple sensory system for use in locating prey.
- E. The speed with which the anteaters located their prey is greater than what might be expected on the basis of chance alone.

6) Which of the following, if true, would most strengthen the hypothesis mentioned in lines 17-19?
- A. Researchers are able to train anteaters to break into an underground chamber that is emitting a strong electrical signal.
- B. Researchers are able to detect a weak electrical signal emanating from the nesting chamber of an ant colony.
- C. Anteaters are observed taking increasingly longer amounts of time to locate the nesting chambers of ants.
- D. Anteaters are observed using various angles to break into nests of ants.
- E. Anteaters are observed using the same angle used with nests of ants to break into the nests of other types of prey.

PASSAGE 2

Although genetic mutations in bacteria and viruses can lead to epidemics, some epidemics are caused by bacteria and viruses that have undergone no significant genetic change. In analyzing the latter, scientists have discovered the importance of social and ecological factors to epidemics. Poliomyelitis , for example, emerged as an epidemic in the United States in the twentieth century; by then , modern sanitation was able to delay exposure to polio until adolescence or adulthood, at which time polio infection produced paralysis. Previously, infection had occurred during infancy, when it typically provided lifelong immunity without paralysis. Thus, the hygiene that helped prevent typhoid epidemics indirectly fostered a paralytic polio epidemic. Another example is Lyme disease, which is caused by bacteria that are transmitted by deer ticks. It occurred only sporadically during the late nineteenth century but has recently become prevalent in parts of the United States, largely due to an increase in the deer population that occurred simultaneously with the growth of the suburbs and increased outdoor recreational activities in the deer's habitat. Similarly, an outbreak of dengue hemorrhagic fever became an epidemic in Asia in the 1950's because of ecological changes that caused Aedes aegypti, the mosquito that transmits the dengue virus, to proliferate. The stage is now set in the United States for a dengue epidemic because of the inadvertent introduction and wide dissemination of another mosquito, Aedes albopictus.

1) The passage suggests that a lack of modern sanitation would make which of the following most likely to occur?
- A. An outbreak of Lyme disease
- B. An outbreak of dengue hemorrhagic fever
- C. An epidemic of typhoid
- D. An epidemic of paralytic polio among infants
- E. An epidemic of paralytic polio among adolescents and adults

2) According to the passage, the outbreak of dengue hemorrhagic fever in the 1950's occurred for which of the following reasons?
- A. The mosquito Aedes aegypti was newly introduced into Asia.
- B. The mosquito Aedes aegypti became more numerous.
- C. The mosquito Aedes albopictus became infected with the dengue virus.
- D. Individuals who would normally acquire immunity to the dengue virus as infants were not infected until later in life.
- E. More people began to visit and inhabit areas in which mosquitoes live and breed.

3) It can be inferred from the passage that Lyme disease has become prevalent in parts of the United States because of which of the following?
- A. The inadvertent introduction of Lyme disease bacteria to the United States
- B. The inability of modern sanitation methods to eradicate Lyme disease bacteria
- C. A genetic mutation in Lyme disease bacteria that makes them more virulent
- D. The spread of Lyme disease bacteria from infected humans to noninfected humans
- E. An increase in the number of humans who encounter deer ticks

4) Which of the following can most reasonably be concluded about the mosquito Aedes albopictus on the basis of information given in the passage?
- A. It is native to the United States.
- B. It can proliferate only in Asia.
- C. It transmits the dengue virus.
- D. It caused an epidemic of dengue hemorrhagic fever in the 1950's.
- E. It replaced Aedes aegypti in Asia when ecological changes altered Aedes aegypti's habitat.

5) Which of the following best describes the organization of the passage?
- A. A paradox is stated, discussed and left unresolved.
- B. Two opposing explanations are presented, argued, and reconciled.
- C. A theory is proposed and is then followed by descriptions of three experiments that support the theory.
- D. A generalization is stated and is then followed by three instances that support the generalization.
- E. An argument is described and is then followed by three counterexamples that refute the argument.

6) Which of the following, if true, would most strengthen the author's assertion about the cause of the Lyme disease outbreak in the United States?
- A. The deer population was smaller in the late nineteenth century than in the mid-twentieth century.
- B. Interest in outdoor recreation began to grow in the late nineteenth century.
- C. In recent years the suburbs have stopped growing.
- D. Outdoor recreation enthusiasts routinely take measures to protect themselves against Lyme disease.
- E. Scientists have not yet developed a vaccine that can prevent Lyme disease.

PASSAGE 3

Coral reefs are one of the most fragile, biologically complex, and diverse marine ecosystems on Earth. This ecosystem is one of the fascinating paradoxes of the biosphere: how do clear, and thus nutrient-poor, waters support such prolific and productive communities? Part of the answer lies within the tissues of the corals themselves. Symbiotic cells of algae known as zooxanthellae carry out photosynthesis using the metabolic wastes of the coral thereby producing food for themselves, for their corals, hosts, and even for other members of the reef community. This symbiotic process allows organisms in the reef community to use sparse nutrient resources efficiently.

Unfortunately for coral reefs, however, a variety of human activities are causing worldwide degradation of shallow marine habitats by adding nutrients to the water. Agriculture, slash-and-burn land clearing, sewage disposal and manufacturing that creates waste by-products all increase nutrient loads in these waters. Typical symptoms of reef decline are destabilized herbivore populations and an increasing abundance of algae and filter-feeding animals. Declines in reef communities are consistent with observations that nutrient input is increasing in direct proportion to growing human populations, thereby threatening reef communities sensitive to subtle changes in nutrient input to their waters.

1) The passage is primarily concerned with
A. describing the effects of human activities on algae in coral reefs
B. explaining how human activities are posing a threat to coral reef communities
C. discussing the process by which coral reefs deteriorate in nutrient-poor waters
D. explaining how coral reefs produce food for themselves
E. describing the abundance of algae and filter-feeding animals in coral reef areas

2) The passage suggests which of the following about coral reef communities?
A. Coral reef communities may actually be more likely to thrive in waters that are relatively low in nutrients.
B. The nutrients on which coral reef communities thrive are only found in shallow waters.
C. Human population growth has led to changing ocean temperatures, which threatens coral reef communities.
D. The growth of coral reef communities tends to destabilize underwater herbivore populations.
E. Coral reef communities are more complex and diverse than most ecosystems located on dry land.

3) The author refers to "filter-feeding animals" in order to
A. provide an example of a characteristic sign of reef deterioration
B. explain how reef communities acquire sustenance for survival
C. identify a factor that helps herbivore populations thrive
D. indicate a cause of decreasing nutrient input in waters that reefs inhabit
E. identify members of coral reef communities that rely on coral reefs for nutrients

4) According to the passage, which of the following is a factor that is threatening the survival of coral reef communities?
A. The waters they inhabit contain few nutrient resources.
B. A decline in nutrient input is disrupting their symbiotic relationship with zooxanthellae.
C. The degraded waters of their marine habitats have reduced their ability to carry out photosynthesis.
D. They are too biologically complex to survive in habitats with minimal nutrient input.
E. Waste by-products result in an increase in nutrient input to reef communities.

5) It can be inferred from the passage that the author describes coral reef communities as paradoxical most likely for which of the following reasons?

A. They are thriving even though human activities have depleted the nutrients in their environment.
B. They are able to survive in spite of an overabundance of algae inhabiting their waters.
C. They are able to survive in an environment with limited food resources.
D. Their metabolic wastes contribute to the degradation of the waters that they inhabit.
E. They are declining even when the water surrounding them remains clear.

PASSAGE 4

Researchers compared the number of tooth fractures in present-day carnivores with tooth fractures in carnivores that lived 36,000 to 10,000 years ago and that were preserved in the Rancho La Brea tar pits in Los Angeles. The breakage frequencies in the extinct species were strikingly higher than those in the present-day species.

In considering possible explanations for this finding, the researchers dismissed demographic bias because older individuals were not overrepresented in the fossil samples. They rejected preservational bias because a total absence of breakage in two extinct species demonstrated that the fractures were not the result of abrasion within the pits. They ruled out local bias because breakage data obtained from other Pleistocene sites were similar to the La Brea data. The explanation they consider most plausible is behavioral differences between extinct and present-day carnivores—in particular, more contact between the teeth of predators and the bones of prey due to more thorough consumption of carcasses by the extinct species. Such thorough carcass consumption implies to the researchers either that prey availability was low, at least seasonally, or that there was intense competition over kills and a high rate of carcass theft due to relatively high predator densities.

1) The primary purpose of the passage is to
A. present several explanations for a well-known fact
B. suggest alternative method of resolving a debate
C. argue in favor of a controversial theory
D. question the methodology used in a study
E. discuss the implications of a research finding

2) The passage suggests that, compared with Pleistocene carnivores in other areas, Pleistocene carnivores in the La Brea area
   A. included the same species, in approximately the same proportions
   B. had a similar frequency of tooth fractures
   C. populated the La Brea more densely
   D. consumed their preys more thoroughly
   E. found it harder to obtain sufficiency prey

3) According to the passage, the researchers believes that the high frequency of tooth breakage in carnivores found at La Brea was caused primarily by
   A. the aging process in individual carnivores
   B. contact between the fossils in the pits
   C. poor preservation of the fossils after they were removed from the pits
   D. the impact of carnivores' teeth against the bones of their prey
   E. the impact of carnivores' teeth against the bones of other carnivores during fights over kills

4) The researchers' conclusion concerning the absence of demographic bias would be most seriously undermined if it were found that
   A. the older as individual carnivore is, the more likely it is to have a large number of tooth fractures
   B. the average age at death of a present-day carnivores is greater than was the average age at death of a Pleistocene carnivore
   C. in Pleistocene carnivore species, older individuals consumed carcasses as thoroughly as did younger individuals
   D. the methods used to determine animals' ages in fossil samples tend to misidentify many older individuals as younger individuals
   E. data concerning the ages of fossil samples cannot provide reliable information about behavioral differences between extinct carnivores and present-day carnivores

5) The passage suggests that if the researchers had not found that two extinct carnivore species were free of tooth breakage, the researchers would have concluded that
   A. the difference in breakage frequencies could have been the result of damage to the fossil remains in the La Brea pits
   B. the fossils in other Pleistocene sites could have higher breakage frequencies than do the fossils in the La Brea pits
   C. Pleistocene carnivore species probably behaved very similarly to one another with respect to consumption of carcass
   D. all Pleistocene carnivores species differed behaviorally from present-day carnivore species
   E. predator densities during the Pleistocene era were extremely high

PASSAGE 5

The Montreal Protocol on Substances that Deplete the Ozone Layer, signed in 1987 by more than 150 nations, has attained its short-term goals: it has decreased the rate of increase in amounts of most ozone-depleting chemicals reaching the atmosphere and has even reduced the atmospheric levels of some of them. The projection that the ozone layer will substantially recover from ozone depletion by 2050 is based on the assumption that the protocol's regulations will be strictly followed. Yet there is considerable evidence of violations, particularly in the form of the release of ozone-depleting chlorofluorocarbons , which are commonly used in the refrigeration, heating, and air conditioning industries. These violations reflect industry attitudes; for example, in the United States, 48 percents of respondents in a recent survey of subscribers to Air Conditioning, Heating, and Refrigeration News, an industry trade journal, said that they did not believe that CFC's damage the ozone layer. Moreover, some in the industry apparently do not want to pay for CFC substitutes, which can run five times the cost of CFC's. Consequently, a black market in imported illicit CFC's has grown. Estimates of the contraband CFC trade range from 10,000 to 22,000 tons a year, with most of the CFC's originating in India and China, whose agreements under the Protocol still allow them to produce CFC's. In fact, the United States Customs Service reports that CFC-12 is a contraband problem second only to illicit drugs.

1) According to the passage, which of the following best describes most ozone-depleting chemicals in 1996 as compared to those in 1987?
   A. The levels of such chemicals in the atmosphere had decreased.
   B. The number of such chemicals that reached the atmosphere had declined.
   C. The amounts of such chemicals released had increased but the amounts that reached the atmosphere had decreased.
   D. The rate of increase in amounts of such chemicals reaching the atmosphere had decreased.
   E. The rate at which such chemicals were being reduced in the atmosphere had slowed.

2) The author of the passage compares the smuggling of CFC's to the illicit drug trade most likely for which of the following reasons?
   A. To qualify a previous claim
   B. To emphasize the extent of a problem
   C. To provide an explanation for an earlier assertion
   D. To suggest that the illicit CFC trade, likely the illicit drug trade, will continue to increase
   E. To suggest that the consequences of a relatively little-known problem are as serious as those of a well-known one

3) The passage suggests which of the following about the illicit trade in CFC's?
   A. It would cease if manufacturers in India and China stopped producing CFC's.
   B. Most people who participate in such trade do not believe that CFC's deplete the ozone layer.
   C. It will probably surpass illicit drugs as the largest contraband problem faced by the United States Custom Services.
   D. It is fostered by people who do not want to pay the price of CFC substitutes.
   E. It has grown primarily because of the expansion of the refrigeration, heating, and air-conditioning industries in foreign countries.

PASSAGE 6

No very satisfactory account of the mechanism that caused the formation of the ocean basins has yet been given. The traditional view supposes that the upper mantle of the earth behaves as a liquid when it is subjected to small forces for long periods and that differences in temperature under oceans and continents are sufficient to produce convection in the mantle of the earth with rising convection currents under the mid-ocean ridges and sinking currents under the continents. Theoretically, this convection would carry the continental plates along as though they were on a conveyor belt and would provide the forces needed to produce the split that occurs along the ridge. This view may be correct: it has the advantage that the currents are driven by temperature differences that themselves depend on the position of the continents. Such a back-coupling, in which the position of the moving plate has an impact on the forces that move it, could produce complicated and varying motions.

On the other hand, the theory is implausible because convection does not normally occur along lines, and it certainly does not occur along lines broken by frequent offsets or changes in direction, as the ridge is. Also it is difficult to see how the theory applies to the plate between the Mid-Atlantic Ridge and the ridge in the Indian Ocean. This plate is growing on both sides, and since there is no intermediate trench, the two ridges must be moving apart. It would be odd if the rising convection currents kept exact pace with them. An alternative theory is that the sinking part of the plate, which is denser than the hotter surrounding mantle, pulls the rest of the plate after it. Again it is difficult to see how this applies to the ridge in the South Atlantic, where neither the African nor the American plate has a sinking part.
Another possibility is that the sinking plate cools the neighboring mantle and produces convection currents that move the plates. This last theory is attractive because it gives some hope of explaining the enclosed seas, such as the Sea of Japan. These seas have a typical oceanic floor, except that the floor is overlaid by several kilometers of sediment. Their floors have probably been sinking for long periods. It seems possible that a sinking current of cooled mantle material on the upper side of the plate might be the cause of such deep basins. The enclosed seas are an important feature of the earth's surface, and seriously require explanation because, in addition to the enclosed seas that are developing at present behind island arcs, there are a number of older ones of possibly similar origin, such as the Gulf of Mexico, the Black Sea, and perhaps the North Sea.

1) According to the traditional view of the origin of the ocean basins, which of the following is sufficient to move the continental plates?
- A. Increases in sedimentation on ocean floors
- B. Spreading of ocean trenches
- C. Movement of mid-ocean ridges
- D. Sinking of ocean basins
- E. Differences in temperature under oceans and continents

2) It can be inferred from the passage that, of the following, the deepest sediments would be found in the
- A. Indian Ocean
- B. Black Sea
- C. Mid-Atlantic
- D. South Atlantic
- E. Pacific

3) The author refers to a "conveyor belt" in in order to
- A. illustrate the effects of convection in the mantle
- B. show how temperature differences depend on the positions of the continents
- C. demonstrate the linear nature of the Mid-Atlantic Ridge
- D. describe the complicated motions made possible by back-coupling
- E. account for the rising currents under certain mid-ocean ridges

4) The author regards the traditional view of the origin of the oceans with
- A. slight apprehension
- B. absolute indifference
- C. indignant anger
- D. complete disbelief
- E. guarded skepticism

5) According to the passage, which of the following are separated by a plate that is growing on both sides?
- A. The Pacific Ocean and the Sea of Japan
- B. The South Atlantic Ridge and the North Sea Ridge
- C. The Gulf of Mexico and the South Atlantic Ridge
- D. The Mid-Atlantic Ridge and the Indian Ocean Ridge
- E. The Black Sea and the Sea of Japan

6) Which of the following, if it could be demonstrated, would most support the traditional view of ocean formation?
- A. Convection usually occurs along lines.
- B. The upper mantle behaves as a dense solid.
- C. Sedimentation occurs at a constant rate.
- D. Sinking plates cool the mantle.
- E. Island arcs surround enclosed seas.

7) According to the passage, the floor of the Black Sea can best be compared to a
   A. rapidly moving conveyor belt
   B. slowly settling foundation
   C. rapidly expanding balloon
   D. violently erupting volcano
   E. slowly eroding mountain

8) Which of the following titles would best describe the content of the passage?
   A. A Description of the Oceans of the World
   B. Several Theories of Ocean Basin Formation
   C. The Traditional View of the Oceans
   D. Convection and Ocean Currents
   E. Temperature Differences among the Oceans of the World

PASSAGE 7

The fossil remains of the first flying vertebrates, the pterosaurs, have intrigued paleontologists for more than two centuries. How such large creatures, which weighed in some cases as much as a piloted hang-glider and had wingspans from 8 to 12 meters, solved the problems of powered flight, and exactly what these creatures were—reptiles or birds—are among the questions scientists have puzzled over.

Perhaps the least controversial assertion about the pterosaurs is that they were reptiles. Their skulls, pelvises, and hind feet are reptilian. The anatomy of their wings suggests that they did not evolve into the class of birds. In pterosaurs a greatly elongated fourth finger of each forelimb supported a wing-like membrane. The other fingers were short and reptilian, with sharp claws. In birds the second finger is the principal strut of the wing, which consists primarily of feathers. If the pterosaurs walked on all fours, the three short fingers may have been employed for grasping. When a pterosaur walked or remained stationary, the fourth finger, and with it the wing, could only turn upward in an extended inverted V-shape along each side of the animal's body.

The pterosaurs resembled both birds and bats in their overall structure and proportions. This is not surprising because the design of any flying vertebrate is subject to aerodynamic constraints. Both the pterosaurs and the birds have hollow bones, a feature that represents a savings in weight. In the birds, however, these bones are reinforced more massively by internal struts.

Although scales typically cover reptiles, the pterosaurs probably had hairy coats. T. H. Huxley reasoned that flying vertebrates must have been warm-blooded because flying implies a high rate of metabolism, which in turn implies a high internal temperature. Huxley speculated that a coat of hair would insulate against loss of body heat and might streamline the body to reduce drag in flight. The recent discovery of a pterosaur specimen covered in long, dense, and relatively thick hairlike fossil material was the first clear evidence that his reasoning was correct.

Efforts to explain how the pterosaurs became airborne have led to suggestions that they launched themselves by jumping from cliffs, by dropping from trees, or even by rising into light winds from the crests of waves. Each hypothesis has its difficulties. The first wrongly assumes that the pterosaurs' hind feet resembled a bat's and could serve as hooks by which the animal could hang in preparation for flight. The second hypothesis seems unlikely because large pterosaurs could not have landed in trees without damaging their wings. The third calls for high waves to channel updrafts. The wind that made such waves however, might have been too strong for the pterosaurs to control their flight once airborne.

1) It can be inferred from the passage that scientists now generally agree that the
   A. enormous wingspan of the pterosaurs enabled them to fly great distances
   B. structure of the skeleton of the pterosaurs suggests a close evolutionary relationship to bats
   C. fossil remains of the pterosaurs reveal how they solved the problem of powered flight
   D. pterosaurs were reptiles
   E. pterosaurs walked on all fours

2) The author views the idea that the pterosaurs became airborne by rising into light winds created by waves as
   A. revolutionary
   B. unlikely
   C. unassailable
   D. probable
   E. outdated

3) According to the passage, the skeleton of a pterosaur can be distinguished from that of a bird by the
   A. size of its wingspan
   B. presence of hollow spaces in its bones
   C. anatomic origin of its wing strut
   D. presence of hooklike projections on its hind feet
   E. location of the shoulder joint joining the wing to its body

4) The ideas attributed to T. H. Huxley in the passage suggest that he would most likely agree with which of the following statements?
   A. An animal's brain size has little bearing on its ability to master complex behaviors.
   B. An animal's appearance is often influenced by environmental requirements and physical capabilities.

C. Animals within a given family group are unlikely to change their appearance dramatically over a period of time.
D. The origin of flight in vertebrates was an accidental development rather than the outcome of specialization or adaptation.
E. The pterosaurs should be classified as birds, not reptiles.

5) It can be inferred from the passage that which of the following is characteristic of the pterosaurs?
A. They were unable to fold their wings when not in use.
B. They hung upside down from branches as bats do before flight.
C. They flew in order to capture prey.
D. They were an early stage in the evolution of the birds.
E. They lived primarily in a forest-like habitat.

6) Which of the following best describes the organization of the last paragraph of the passage?
A. New evidence is introduced to support a traditional point of view.
B. Three explanations for a phenomenon are presented, and each is disputed by means of specific information.
C. Three hypotheses are outlined, and evidence supporting each is given.
D. Recent discoveries are described, and their implications for future study are projected.
E. A summary of the material in the preceding paragraphs is presented, and conclusions are drawn.

7) It can be inferred from the passage that some scientists believe that pterosaurs
A. lived near large bodies of water
B. had sharp teeth for tearing food
C. were attacked and eaten by larger reptiles
D. had longer tails than many birds
E. consumed twice their weight daily to maintain their body temperature

PASSAGE 8

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: neutrinos. With 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. Neutrinos 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 could provide new information about a wide variety of cosmic phenomena and about the history of the universe.

But how can scientists detect a particle that interacts so infrequently with other matter? Twenty-five years passed between Pauli's 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, capable of detecting cosmic neutrinos, is difficult to construct. No apparatus can detect neutrinos unless it is extremely massive, because great mass is synonymous with huge numbers of nucleons , and the more massive the detector, the greater the probability of one of its nucleon's 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 mass of the ocean. Named DUMAND, for Deep Underwater Muon and Neutrino Detector, the project calls for placing an array of light sensors at a depth of five kilometers under the ocean surface. The detecting medium is the seawater itself: when a neutrino interacts with a 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 seawater above the sensors will shield them from the interfering effects of other high-energy particles raining down 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 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

4) According to the passage, the primary use of the apparatus mentioned in lines 24-32 would be to
   A. increase the mass of a neutrino
   B. interpret the information neutrinos carry with them
   C. study the internal structure of a neutrino
   D. see neutrinos in distant regions of space
   E. detect the presence of cosmic neutrinos

5) The passage states that interactions between neutrinos and other matter are
   A. rare
   B. artificial
   C. undetectable
   D. unpredictable
   E. hazardous

6) The passage mentions which of the following as a reason that neutrinos are hard to detect?
   A. Their pervasiveness in the universe
   B. Their ability to escape from different regions of space
   C. Their inability to penetrate dense matter
   D. The similarity of their structure to that of nucleons
   E. The infrequency of their interaction with other matter

7) According to the passage, the interaction of a neutrino with other matter can produce
   A. particles that are neutral and massive
   B. a form of radiation that permeates the universe
   C. inaccurate information about the site and circumstances of the neutrino's production
   D. charged particles and light
   E. a situation in which light and other forms of electromagnetic radiation are blocked

8) According to the passage, one of the methods used to establish the properties of neutrinos was
   A. detection of photons
   B. observation of the interaction of neutrinos with gamma rays
   C. observation of neutrinos that were artificially created
   D. measurement of neutrinos that interacted with particles of seawater
   E. experiments with electromagnetic radiation

Answer key:-

Passage- 1	**1)** D	**2)** C	**3)** A	**4)** C	**5)** E	**6)** B					
Passage- 2	**1)** C	**2)** B	**3)** E	**4)** C	**5)** D	**6)** A					
Passage- 3	**1)** B	**2)** A	**3)** A	**4)** E	**5)** C						
Passage- 4	**1)** E	**2)** B	**3)** D	**4)** D	**5)** A						
Passage- 5	**1)** D	**2)** B	**3)** D								
Passage- 6	**1)** E	**2)** B	**3)** A	**4)** E	**5)** D	**6)** A	**7)** B	**8)** B			
Passage- 7	**1)** D	**2)** B	**3)** C	**4)** B	**5)** A	**6)** B	**7)** A				
Passage-8	**1)** A	**2)** C	**3)** A	**4)** D	**5)** E	**6)** A	**7)** E	**8)** D	**9)** C		