SAT LONG READING 4

1 Reading passage

Scientists have long known that the soft surface of the bill of the platypus is perforated with openings that contain sensitive nerve endings. Only recently, however, have biologists concluded on the basis of new evidence that the animal uses its bill to locate its prey while underwater, a conclusion suggested by the fact that the animal's eyes, ears, and nostrils are sealed when it is submerged. The new evidence comes from neurophysiological studies, which have recently revealed that within the pores on the bill there are two kinds of sensory receptors: mechanoreceptors, which are tiny pushrods that respond to tactile pressure, and electroreceptors, which respond to weak electrical fields. Having discovered that tactile stimulation of the pushrods sends nerve impulses to the brain, where they evoke an electric potential over an area of the neocortex much larger than the one stimulated by input from the limbs, eyes, and ears, Bohringer concluded that the bill must be the primary sensory organ for the platypus. Her finding was supported by studies showing that the bill is extraordinarily sensitive to tactile stimulation: stimulation with a fine glass stylus sent a signal by way of the fifth cranial nerve to the neocortex and from there to the motor cortex. Presumably nerve impulses from the motor cortex then induced a snapping movement of the bill. But Bohringer's investigations did not explain how the animal locates its prey at a distance.

Scheich's neurophysiological studies contribute to solving this mystery. His initial work showed that when a platypus feeds, it swims along steadily wagging its bill from side to side until prey is encountered. It thereupon switches to searching behavior, characterized by erratic movements of the bill over a small area at the bottom of a body of water, which is followed by homing in on the object and seizing it. In order to determine how the animal senses prey and then distinguishes it from other objects on the bottom, Scheich hypothesized that a sensory system based on electroreception similar to that found in sharks might exist in the platypus. In further experiments he found he could trigger the switch from patrolling to searching behavior in the platypus by creating a dipole electric field in the water with the aid of a small 1.5 volt battery. The platypus, sensitive to the weak electric current that was created, rapidly oriented toward the battery at a distance of 10 centimeters and sometimes as much as 30 centimeters. Once the battery was detected, the platypus would inevitably attack it as if it were food. Scheich then discovered that the tail flicks of freshwater shrimp, a common prey of the platypus, also produce weak electric fields and elicit an identical response. Scheich and his colleagues believe that it is reasonable to assume that all the invertebrates on which the platypus feeds must produce electric fields.

2 Question

1. The primary purpose of the passage is to

(A) explain how the platypus locates prey at a distance

(B) present some recent scientific research on the function of the platypus's bill

(C) assess the results of Bohringer's experimental work about the platypus

(D) present Scheich's contributions to scientific work about the platypus
(E) describe two different kinds of pores on the platypus's bill

2. Which one of the following statements best expresses the main idea of the passage?

(A) Neurophysiological studies have established that the bill of the platypus is one of its primary sensory organs.
(B) Neurophysiological studies have established that the platypus uses its bill to locate its prey underwater.
(C) Bohringer's neurophysiological studies have established that sensory receptors in the bill of the platypus respond to electrical stimulation.
(D) Biologists have concluded that the surface of the bill of the platypus is perforated with openings that contain sensitive nerve endings.
(E) Biologists have concluded that the hunting platypus responds to weak electric fields emitted by freshwater invertebrates.

3. During the studies supporting Bohringer's finding, as they are described in the passage, which one of the following occurred before a nerve impulse reached the motor cortex of the platypus?

(A) The electroreceptors sent the nerve impulse to the fifth cranial nerve.
(B) The neocortex induced a snapping movement of the bill.
(C) The mechanoreceptors sent the nerve impulse via the fifth cranial nerve to the electroreceptors.
(D) The platypus opened the pores on its bill.
(E) The fifth cranial nerve carried the nerve impulse to the neocortex.

4. Which one of the following strategies is most similar to Scheich's experimental strategy as it is described in the passage?

(A) To determine the mating habits of birds, a biologist places decoys near the birds' nests that resemble the birds and emit bird calls.
(B) To determine whether certain animals find their way by listening for echoes to their cries, a biologist plays a tape of the animals' cries in their vicinity.
(C) To determine whether an animal uses heat sensitivity to detect prey, a biologist places a heat-generating object near the animal's home.
(D) A fisherman catches fish by dangling in the water rubber replicas of the fishes' prey that have been scented with fish oil.
(E) A game warden captures an animal by baiting a cage with a piece of meat that the animal will want to eat.

5. It can be inferred from the passage that during patrolling behavior, the platypus is attempting to

(A) capture prey that it has detected
(B) distinguish one kind of prey from another
(C) detect electric fields produced by potential prey
(D) stimulate its mechanoreceptors
(E) pick up the scent of its prey

6. Which one of the following best describes the organization of the passage?

(A) A hypothesis is presented and defended with supporting examples.
(B) A conclusion is presented and the information supporting it is provided.
(C) A thesis is presented and defended with an argument.
(D) Opposing views are presented, discussed, and then reconciled.
(E) A theory is proposed, considered, and then amended.

3 Answer

Question	1	2	3	4	5	6
Answer	B	B	E	C	C	B