CHAPTER

6

CONTROL AND COORDINATION

CLASS 10TH

NCERT EXERCISE AND SOLUTIONS - SCIENCE

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Q. 1. Which of the following is a plant hormone?

(a) Insulin
(b) Thyroxin
(c) Oestrogen
(d) Cytokinin

ANSWER:-

(d) Cytokinin

Q. 2. The gap between two neurons is called a:

(a) Dendrite
(b) Synapse
(c) Axon
(d) Impulse

ANSWER:-

(b) Synapse

Q. 3. The brain is responsible for:

(a) Thinking
(b) Regulating the heartbeat
(c) Balancing the body
(d) All of the above

ANSWER:-

(d) All of the above

Q. 4. What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?

ANSWER:-

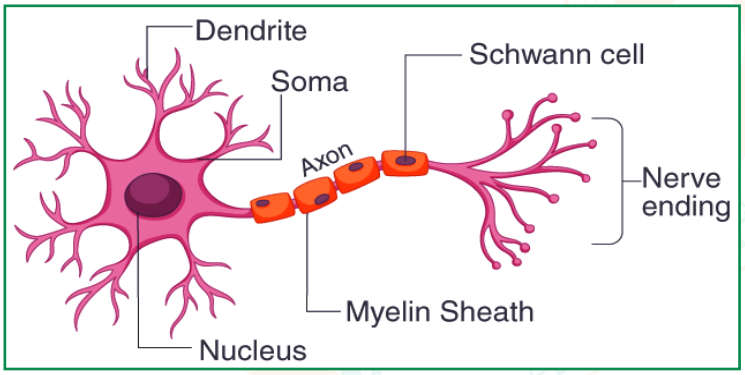
Sensory cells, also known as receptor cells, are typically located in our sense organs, including the inner ear, nose, tongue, eyes, and skin. The functions of receptors are as follows:

- They detect environmental stimuli such as heat or pain.
- They send a message to the spinal cord by generating an impulse in the sensory neuron. If receptors are damaged, they fail to transmit external stimuli to the brain, which can result in the loss of sensory perception. This damage may harm the body's tissues and organs. For instance, if a person's receptors are impaired, they may not be able to hear when called.

Q. 5. Draw the structure of a neuron and explain its function.

ANSWER:-

The neuron is the structural and functional unit of the nervous system. It consists of three main components: the axon, dendrite, and cell body.



The functions of a neuron include:

- Transmitting impulses from the external environment to the brain or spinal cord.
- Coordinating the brain or spinal cord with other organs.

Q. 6. How does phototropism occur in plants?

ANSWER:-

Phototropism is the movement of plant parts in response to light. Shoots exhibit positive phototropism, while roots display negative phototropism. The process is driven by auxins, such as indole-acetic acid (IAA). When one side of the shoot is exposed to light, IAA molecules accumulate on the shaded side. This leads to cell division and elongation on the shaded side, causing faster growth compared to the light-exposed side. As a result, the shoot bends toward the light.

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Q. 7. Which signals will get disrupted in case of a spinal cord injury?

ANSWER:-

Injury to the spinal cord will interfere with all nerve signalling. This disruption affects the transmission of impulses from receptors to the brain, as well as the brain's ability to send responses to effectors, especially motor neurons.

Q. 8. How does chemical coordination occur in plants?

ANSWER:-

Plants respond to stimuli by moving their leaves. Plant hormones, also known as **phytohormones**, are a group of chemical molecules that regulate and coordinate plant growth, development, and responses to the environment. These hormones are produced in specific areas of the plant and transported to other parts.

For instance, hormones produced in the roots are moved to other sections when needed. The five main types of phytohormones are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. Auxins, gibberellins, cytokinins, and ethylene promote growth, while abscisic acid acts as a growth inhibitor.

Q. 9. What is the need for a system of control and coordination in an organism?

ANSWER:-

Coordination is the process of maintaining proper body function in response to changes, achieved by the collaboration of distinct and integrated body systems. All actions resulting from stimuli need to be carefully coordinated and regulated. Proper control over responses to stimuli enhances the efficiency of these mechanisms. The organism's ability to function effectively depends on the coordination of various reactions when considering the stimuli and their effects.

Therefore, it is essential to synchronize multiple physiological processes and responses. In animals, the nervous and muscular systems are responsible for controlling and coordinating movement, while phytohormones regulate and coordinate plant behaviour.

Q. 10. How are involuntary actions and reflex actions different from each other?

ANSWER:-

Involuntary actions are those that occur without our conscious control, such as the movement of food through the alimentary canal. These actions are regulated by the brain.

On the other hand, reflex actions, like quickly pulling your hand away from a hot object, happen instantly and do not require thought. Unlike involuntary actions, reflex actions are not controlled by the brain. Involuntary actions, such as heartbeat and peristalsis, cannot be conditioned, whereas reflex actions can be. While all reflex actions are involuntary, not all involuntary actions are reflex actions.

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Q. 11. Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

ANSWER:-

Nervous System Mechanism	Hormonal System Mechanism
• Information is transmitted as an electrical impulse.	• Chemical messengers are used to transmit information.
• Information is conveyed through coordinated action of axons and dendrites.	• Blood carries and conveys information.
• The transmission and response are rapid.	• Information moves slowly, and responses are also slow.
• Has a short-term impact.	• Has a long-term impact.
• Does not induce growth.	• Can induce growth.

Q. 12. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?

ANSWER:-

Movement in Sensitive Plants	Movement in Our Legs
In sensitive plants like *Mimosa pudica*, movement occurs in response to touch (stimulus).	Voluntary movements, such as those of our legs, are consciously controlled.
Since plants lack specialized tissue for impulse transmission, information is passed from cell to cell through electrochemical signals.	These movements are regulated by the brain, as signals or messages are sent to it.
The movement happens as plant cells change shape due to changes in water content.	Movement in leg muscles is facilitated by certain proteins in animal muscle cells.

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