

# Science

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(Chapter 7)(Control and Coordination)

Class - 10

## Exercises

### Question 1:

Which of the following is a plant hormone?

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

### Answer 1:

(d) Cytokinin is a plant hormone.

### Question 2:

The gap between two neurons is called a

- (a) dendrite.
- (b) synapse.
- (c) axon.
- (d) impulse.

### Answer 2:

(b) The gap between two neurons is called a synapse.

### Question 3:

The brain is responsible for

- (a) thinking.
- (b) regulating the heart beat.
- (c) balancing the body.
- (d) all of the above.

### Answer 3:

(d) The brain is responsible for thinking, regulating the heart beat and balancing the body.

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## Question 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 4:

Receptors are sensory structures (organs/tissues or cells) present all over the body. The receptors are either grouped in case of eye or ear, or scattered in case of skin.

Functions of receptors:

- They sense the external stimuli such as heat or pain.
- They also trigger an impulse in the sensory neuron which sends message to the spinal cord.

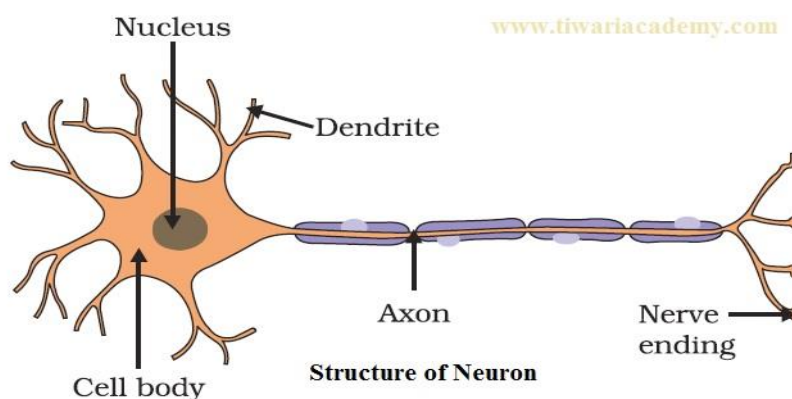
When the receptors are damaged, the external stimuli transferring signals to the brain are not felt. For example, in the case of damaged receptors, if we accidentally touch any hot object, then our hands might get burnt as damaged receptors cannot perceive the external stimuli of heat and pain.

## Question 5:

Draw the structure of a neuron and explain its function.

## Answer 5:

Neurons are the functional units of the nervous system. The three main parts of a neuron are axon, dendrite and cell body.



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*Functions of the three parts of a neuron:*

- **Axon:** It conducts messages away from the cell body.
- **Dendrite:** It receives information from axon of another cell and conducts the messages towards the cell body.
- **Cell body:** It contains nucleus, mitochondria, and other organelles. It is mainly concerned with the maintenance and growth.

## Question 6:

How does phototropism occur in plants?

### Answer 6:

The movement of plant in response to light is called phototropism. Stem shows positive phototropism as follows:

When growing plants detect light, a hormone called auxin, synthesised at the shoot tip, helps the cells to grow longer. When light is coming from one side of the plant, auxin diffuses towards the shady side of the shoot. This concentration of auxin stimulates the cells to grow longer on the side of the shoot which is away from light. Thus, the plant appears to bend towards light.

## Question 7:

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

### Answer 7:

The reflex arc connections between the input and output nerves meet in a bundle in the spinal cord. In fact, nerves from all over the body meet in a bundle in the spinal cord on their way to the brain. In case of any injury to the spinal cord, the signals coming from the nerves as well as the signals coming to the receptors will be disrupted.

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## Question 8:

How does chemical coordination occur in plants?

### Answer 8:

Animals have a nervous system for controlling and coordinating the activities of the body. But plants have neither a nervous system nor muscles.

Plants respond to stimuli by showing movements. The growth, development, and responses to the environment in plants is controlled and coordinated by a special class of chemical substances known as hormones. These hormones are produced in one part of the plant body and are translocated to other needy parts. For example, a hormone produced in roots is translocated to other parts when required. The five major types of phytohormone are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. These phytohormones are either growth promoters (such as auxins, gibberellins, cytokinins, and ethylene) or growth inhibitors such as abscisic acid.

## Question 9:

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

### Answer 9:

The maintenance of the body functions in response to changes in the body by working together of various integrated body systems is known as *coordination*. All the movements that occur in response to stimuli are carefully coordinated and controlled. In animals, the control and coordination movements are provided by nervous and muscular systems. The nervous system sends messages to and away from the brain. The spinal cord plays an important role in the relay of messages. In the absence of this system of control and coordination, our body will not be able to function properly.

For example, when we accidentally touch a hot utensil, we immediately withdraw our hand. In the absence of nerve transmission, we will not withdraw our hand and may get burnt.

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## Question 10:

How are involuntary actions and reflex actions different from each other?

## Answer 10:

*Involuntary actions* cannot be consciously controlled. For example, we cannot consciously control the movement of food in the alimentary canal or pumping of blood through heart. These actions are however directly under the control of the brain. On the other hand, the *reflex actions* such as closing of eyes immediately when bright light is focused show sudden response and do not involve any thinking. This means that unlike involuntary actions, the reflex actions are not under the control of brain.

## Question 11:

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

## Answer 11:

<i>Nervous system mechanism</i>		<i>Hormonal system mechanism</i>	
1.	The information is conveyed in the form of electric impulse.	1.	The information is conveyed in the form of chemical messengers.
2.	The axons and dendrites transmit the information through a coordinated effort.	2.	The information is transmitted or transported through blood.
3.	The flow of information is rapid and the response is quick.	3.	The information travels slowly and the response is slow.
4.	Its effects are short lived.	4.	It has prolonged effects.

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## Question 12:

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

## Answer 12:

Movement in sensitive plants		Movement in our legs	
1.	The movement that takes place in a sensitive plant such as <i>Mimosa pudica</i> occurs in response to touch (stimulus).	1.	Movement in our legs is an example of voluntary actions.
2.	For this movement, the information is transmitted from cell to cell by electrochemical signals as plants do not have any specialised tissue for conduction of impulses.	2.	The signal or messages for these actions are passed to the brain and hence are consciously controlled.
3.	For this movement to occur, the plant cells change shape by changing the amount of water in them.	3.	In animal muscle cells, some proteins are found which allow the movement to occur.

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