

CONTROL AND COORDINATION

Solved Intext Exercises

Q1. What is the difference between a reflex action and walking.

Sol. Reflex action

1. Reflex action is the sudden action in response to something in the environment.
2. It is controlled by the spinal cord.
3. It occurs in a fraction of second.

Walking

1. Walking is the mechanism of electrical impulse which travels in the nerve cells and transmits to the concerning muscles with the result of that the muscles shrink and we start walking.
2. It is controlled by the brain.
3. It occurs in responding by the brains through nerve cells so it takes time.

Q2. What happens at the synapse between two neurons?

Sol. In between two nerve cells or neurons the free tips of dendrites come very close to the free ends of distal axon fibers. When the impulse travels the chemical compound is released which is filled in the gap between the synapse. The impulse travels through this compound into other neuron and after that this compound is withdrawn. Thus the impulse is transmitted from one place or organ to another organ.

Q3. Which part of the brain maintains posture and equilibrium of the body?

Sol. Cerebellum which is part of hind brain is responsible for the maintenance of posture and equilibrium and equilibrium of the body.

Q4. How do we detect the smell of an agarbatti (incense stick)?

Sol. The cerebrum which is a part of the fore brain is responsible for the detection of smell of an agarbatti.

Q5. What is the role of the brain in reflex action?

Sol. In reflex action we do something without thinking about it or without feeling in control of our reactions. The nerves of input and output meet at a point in a bundle in the spinal cord on their way to the brain. Thus the information through input nerves or sensory nerves go to the brain. The brain keeps the information of what reflex action is doing.

Q6. What are plant hormones?

Sol. Plant hormones are the chemical produced in the cells of root and shoot tips. These chemicals are responsible for the growth of the plant body. They are also named as phytohormones.

Q7. How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

Sol. In sensitive plants like *Mimosa pudica* (Touch me not), there is electrical-chemical means to convey the information of touch cell to cell. Plant cells change shape by changing the amount of water in them resulting in swelling or shrinking and therefore in changing shapes.

This type of movement in sensitive plant is totally different from the movement of a shoot towards light in the following way.

The movement of the plant (shoot and root) due to the influence of sunlight is called phototropism. In this movement the cells of that part which are in direct contact of light shrink due to the transfer of water from these cells to the cells of opposite side. Thus the plant part bend towards sunlight. It is called positive phototropic. It does not have the effect of sensation by electrical-chemical means.

Q8. Given an example of plant hormone that promotes growth.

Sol. Auxin is a plant hormone which is produced in the cells of the tip of main stem and its branches. It increases the cells in length and helps in plant growth.

Q9. How do auxins promote the growth of a tendril around the support?

Sol. In weak plants like pea, the cells of the tip of the tendril produce auxins. The side part of the tendril which comes in contact with the support, transfers its auxins along with water towards opposite side the support.

Q10. Design an experiment to demonstrate hydrotropism.

Sol.

AIM: To demonstrate hydrotropism.

Material required: A trough, soil water and germinating seeds or baby plants, perforated card board sheet equal to the diameter of trough.

Procedure

1. Take a trough
2. Fix the perforated card board sheet in the trough vertically.
3. Half fill one part of the trough with soil and the other half or second part of the trough with water.
4. Now fix the germinating seed or baby plants in the soil.
5. Keep the whole apparatus in the sun in open place for few days.

Observations: After a few days, the following changes are observed:

1. The roots bend towards water.
2. The shoot part bends away from water.

Result: The experiment confirms that:

1. Water has positive effect on roots which is called positive hydrotropism.
2. Water has negative effect on shoot (stem and other aerial parts) which is called as negative hydrotropism.

Precautions:

1. Apparatus should be placed at open place in the sun so that plants may get all the necessary conditions.
2. Perforations in the carboard sheet should neither be too big nor too small. Water should be diffused slowly.

Q11. How does chemical take place in animals?

Sol. Hormones are the chemicals which are produced in several endocrine glands present in animals' body. These chemicals reach to various parts of the body through blood. It can be explained by taking an example. Example: Adrenaline is a hormone secreted in adrenal gland. It is carried to different parts of the body through blood. The target organs on which it acts include the heart. As a result the heart beats faster in order to supply more oxygen to the muscles and thus the target organs get more oxygen and satisfies its need of oxygen to work.

Q12. Why is the use of iodised salt advisable?

Sol. Thyroid glands present in the neck region secrete thyroxin hormone. It is secreted in presence of iodine. So iodised salt is advisable to everybody.

Q13. How does our body respond when adrenaline is secreted into the blood?

Sol. Adrenaline hormone is secreted directly into the blood and carried to different part of the body. It helps in the oxidation of carbohydrates, fats and protein to produce energy. It goes to heart which increases the heart beats. Thus the blood is pumped rapidly which supplies blood quickly to the target organ and thus the organ gets large amount of energy and works.

Q14. Why are some patients of diabetes treated by giving injections of insulin?

Sol. In case of some patients the cells of pancreas do not produce insulin when sugar level in blood is high. In such case they are given insulin injections to decrease the sugar level in the blood.

Solved NCERT Exercises

Q1. Which of the following is a plant hormone?

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

Sol. (d)

Q2. The gap between two neurons is called a

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

Sol. (b)

Q3. The brain is responsible for

- (a) thinking
- (b) regulating the heart beat

(c) balancing the body

(d) all of the above

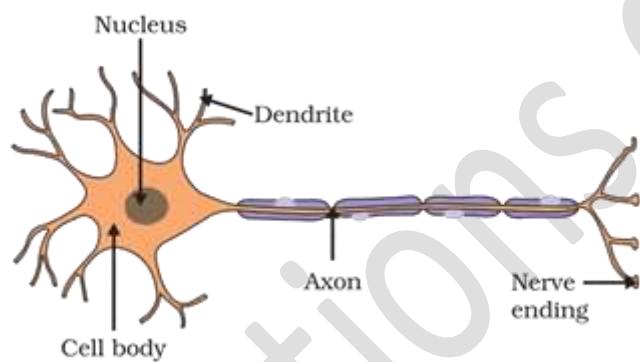
Sol. (d)

Q4. What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?

Sol. Receptors are the organs which receive the information from the environment. If the receptor are receptors is not working properly, the environmental effects will be received by the receptor but the respond from the spinal cord and brain is not coming in due time to the effectors with the result of that the effector will be effected

Q5. Draw the structure of a neuron and explain its function.

Sol.



Function of neuron: The dendrites of a neuron receive the environmental information from the receptor. This information travels in the whole body of neuron and then reaches to the synapse where the chemical compound is secreted out to fill the gap of synapse when the information is passed out into the other neuron, the chemical compound is withdrawn. Thus the information reaches from the receptor to brain and spinal cord.

Q6. How does phototropism occur in plants?

Sol. Phototropism: Photo means light and tropism means movement. Thus the plant parts move with the effect of sunlight. The shoot-stem and other parts related to it in the air show positive phototropism while the whole root system show negatively phototropism.

Q7. Which signals will get disrupted in case of a spinal cord injury?

Sol. The reflex action will get disrupted in case the spinal cord is injured. The finger is put into flame, the person will not snatch his finger due to disruption with spinal cord with the result of that the finger will be burnt.

Q8. How does chemical coordination occur in plants?

Sol. The chemical compounds are called as photohormones or plant hormones. They are produced in the cells of the tips of main stem and branches. These hormones are diffused from the originating cells to the neighbouring cells through diffusion they are responsible for cell elongation, cell multiplication, opening of flowers etc. Thus chemical coordination occur in plants.

Q9. What is the need for a system of control and coordination in an organism?

Sol. In multicellular organisms all the activities concerning to any part of the body are controlled by spinal cord and brain. All the cell of all the parts of the body are connected with them through nerves. There is a thick network of nerves in the whole body. These nerves are of two types i.e. sensory nerves and motor nerves. Sensory nerves carry impulses from the receptor to brain and spinal cord and the response is carried to the effector through motor nerves. All these activities are possible by control and coordination. Brain and spinal cord control over the activities while nerves are the co-ordinating devices.

Q10. How are involuntary actions and reflex actions different from each other?

Sol. Reflex action

1. It is controlled by spinal cord.
2. It is very quick.
3. There is no need of thinking.
4. Response is given to the concerned organ just after receiving the stimulus.

Involuntary actions

1. It is controlled by brain.
2. It takes some time.
3. Brain takes the judgement and then responds accordingly.
4. There is need of thinking and not the environmental stimulus for response.

Q11. Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

Sol. Nervous Co-ordination

1. In this type there is a network of nerves which connects the cells of the body organs to the central.
2. The Co-ordination is controlled by brain and spinal cord.
3. There is no secretion of such type.
4. All type of functions are controlled and coordinate by the nerves and the central nervous system.
5. There is no such effect of this system.
6. The whole system is fixed at its own place in the body.
7. The stimuli and the responses travel in the nerves.
8. The system functions according to the environment stimuli.

Hormonal Co-ordination

1. In this type there is no such system in the body.
2. There is no controlling organ for this coordination.
3. Hormones are secreted in ductless glands.
4. Special hormone is responsible for particular function.
5. Hormone's quantity affects the organ and the system.
6. Endocrine glands are situated at various places in the body.
7. Blood carries the hormones to the concerning body organs.
8. The hormones have no effect of external environment.

Q12. What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?

Sol. Movement in sensitive plants

1. The leaves of sensitive plants are sensitive to touch.

2. They have electrical chemical means to convey the information of touch.
3. It is not controlled by any part of the plant.
4. There is not special tissue in plants for the conduction of information.
5. The cells change their shape by changing the amount of water in them.

Movement in legs of human beings

1. No special organs in leg for such action.
2. The chemical meant to convey acts in this movement.
3. It is controlled by brain and spinal cord.
4. Finally some cell change shape in order for movement to happen.
5. There is no effect of the amount of water on movement of muscles.