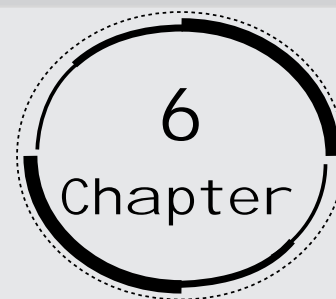


# Control and coordination



## 1. What is the difference between a reflex action and walking?

### Solution:

Reflex action are the involuntary actions that occur in response to stimuli. They occur without involvement of conscious areas of brain. All the reflex actions are unconscious actions. Reflex action occurs brain and spinal cord of central nervous systems.

On the other hand voluntary actions are those which occur under the control of cerebellum of the brain Walking is learnt as we grow. Walking is controlled by brain as is used when required.

## 2. What happens at the synapse between two neurons?

### Solution:

Between the synapse between two neurons electric signals are converted into chemicals that can easily cross over the gap and pass on the chemical messenger to next neuron where it is converted back to electrical signal.

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

### Solution:

Cerebellum which is a part of the brain is responsible for Controls the motor functioning hence it is the part reengaged in the maintenance of posture and equilibrium of the body.

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

### Solution:

Smell of an agarbatti is detected by Nose, olfactory receptors present in the nose sends electrical signal to the fore brain. Fore brain interprets this signal as the incense stick to be detected as smell.

### **5. What is the role of the brain in reflex action?**

#### **Solution:**

Reflex actions are formed instantaneously in response to the stimulus that has no time to think. For instance the sensory nerves that detect the heat are connected to the nerves that move the muscles of the hand. Such a connection of detecting the signal from the nerves (input) and responding to it quickly (output) is known as reflex arc.

Reflex action are generated in spinal cord and the information also reaches brain. This helps the brain to record this event and remember it for future use. Brain helps the person to get awareness of the stimulus and prevent himself from that situation again.

### **1. What are plant hormones?**

#### **Solution:**

Plant hormones are the organic substances produced at certain sites of the plant and are translocated to other parts based on the requirement. Plant hormones help to coordinate growth, development and responses to the environment. Ex: Auxin's Gibberlin's, cytokines, abscisic acid and ethylene.

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

#### **Solution:**

<b>Sl. no</b>	<b>Movement of leaves of the sensitive plant</b>	<b>Movement of a shoot towards light</b>
1	It does not depend on the direction of stimulus applied.	Depends on the direction of stimulus applied.
2	Called as Nastic movement	Called as tropic movement
3	Touch is the stimulus	Light is the stimulus
4	Caused by the sudden loss of water from the swellings at the base of leaves	Caused by the unequal growth on the two sides of the shoot.
5	Not a growth movement	Growth movement
6	Occurs very fast	Occurs slowly

### **3. Give an example of a plant hormone that promotes growth**

#### **Solution:**

Auxins and Gibberlins are the hormone responsible for the growth of plant.

Auxins are responsible for the cell elongation in shoot and also regulates growth.

Gibberlin is responsible for stem elongation and germination.

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

##### Solution:

Auxins are the plant hormones produced at the tip of a shoot and root. Auxins are present at the tip of tendrils. When tendrils are attached around any support their growth is slowed down as auxins are sensitive to touch. This makes them move to the other side of the tip to get support; this makes the other side grow faster than the side of the tendril in contact with the support and the tendril bends towards the support.

#### 5. Design an experiment to demonstrate hydrotropism.

##### Solution:

To demonstrate hydrotropism in plants.

Procedure :

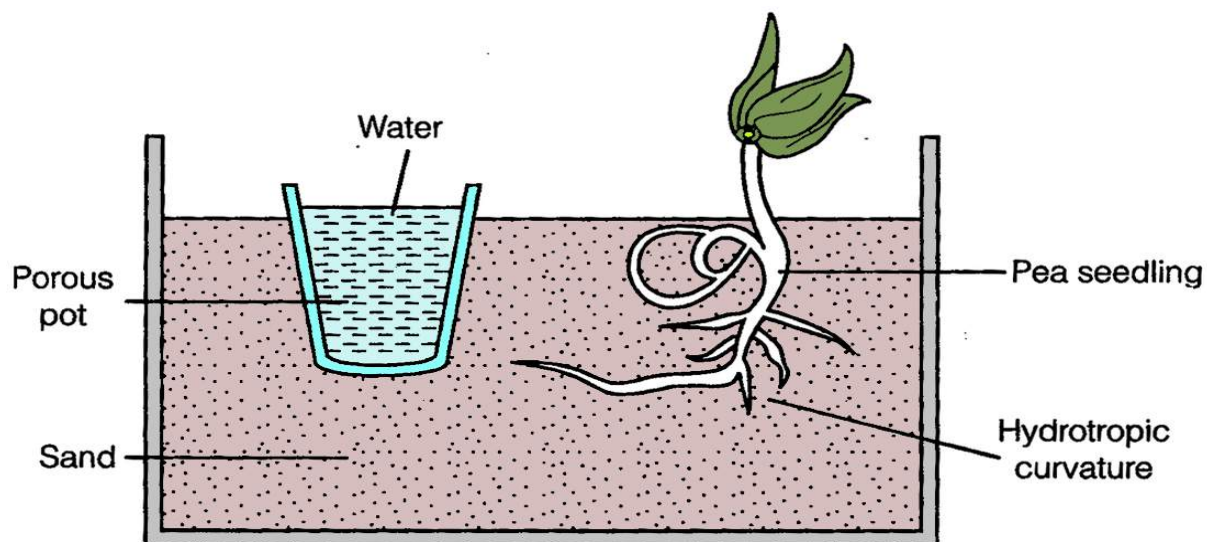
- i. Plant a seedling in a vessel containing soil.
- ii. Adjacent to the seedling put a porous pot containing water.
- iii. Leave the set up for few days.

Observation :

- iv. On examining the roots it is observed that the roots bend towards the source of water and do not grow straight.

result :

It confirms that the plant shows hydrotropism as the roots bend towards the porous pot of water. As hydrotropism is a plant growth response in which the direction of growth is determined by a stimulus of gradient in water concentration.



### **1. How does chemical coordination take place in animals?**

#### **Solution:**

Chemical coordination takes place in animals with the help of chemical messengers called as Hormones. Hormones are the chemical fluids that are secreted by specific glands of the endocrine gland. Hormones regulate the growth, development and homeostasis of the animals.

### **2. Why is the use of iodized salt advisable?**

#### **Solution:**

Usage of Iodized salt is advisable to avoid the deficiency of Iodine. If the intake of iodine is low, the release of thyroxine from the thyroid gland will be decreased. This affects fat, carbohydrate and protein metabolism

Thus a person may have goitre problem in case if the intake of iodine is lowered.

### **3. How does our body respond when adrenaline is secreted into the blood?**

#### **Solution:**

Adrenaline is a hormone secreted when a person is frightened or mentally disturbed. When Adrenaline reaches heart, heartbeat will increase to increase blood supply to our muscles. Adrenaline also increases the breathing rate because of contraction of diaphragm and the rib muscles. Adrenaline rush also increases blood pressure and allows entry of more glucose into blood. These altogether occurs when our body respond to secretion of adrenaline into our blood.

### **4. Why are some patients of diabetes treated by giving injections of insulin?**

#### **Solution:**

Diabetes is a condition where insulin hormone is produced less or stopped by pancreatic cells of a person. Insulin regulates blood glucose by converting extra glucose to glycogen. When insulin is not produced adequately person blood glucose level which leads to adverse effects. In order to maintain the insulin and blood glucose level diabetes patients are treated with injections of insulin.

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

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

**Solution:**

Answer is d) cytokinin.

Cytokinin is a plant hormone whereas Insulin, Thyroxin, Oestrogen are the hormones produced by animals.

**2. The gap between two neurons is called a**

- (a) Dendrite.**
- (b) Synapse.**
- (c) Axon.**
- (d) Impulse.**

**Solution:**

Answer is (b) Synapse

Dendrite is a short branched extension of a nerve cell, along which impulses received from other cells at synapses are transmitted to the cell body.

An axon or nerve fiber is a long, slender projection of a nerve cell or neuron in vertebrates that typically conducts electrical impulses known as action potentials away from the nerve cell body. The function of the axon is to transmit information to different neurons, muscles, and glands.

Impulse an electrical signal that travels along axon.

**3. The brain is responsible for**

- (a) Thinking.**
- (b) Regulating the heartbeat.**
- (c) Balancing the body.**
- (d) all of the above.**

**Solution:**

Answer is (d) all the above

Brain is responsible for thinking, brain regulates the heartbeat, and it balance the body.

**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?**

**Solution:**

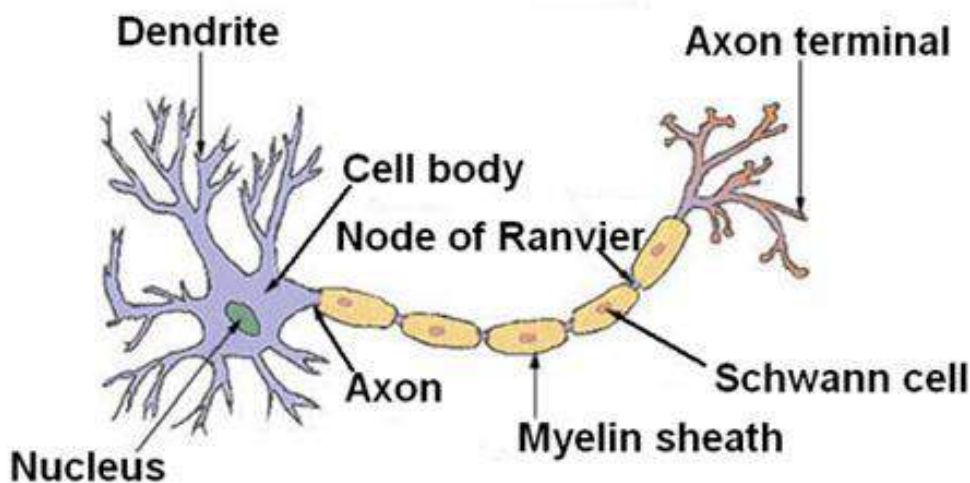
Receptors are present throughout our body mainly sense organs. Receptors collect the information about changes that happen around us and send the signal to information to brain which render effector mechanism against the change. When receptors do not work properly, the environmental stimuli are not able to create nerve impulses and body does not respond.

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

**Solution:**

Neurons are nerve cells which are functional units of the nervous system. Three main parts of neurons are Dendrites, Axons and cell body.

## Structure of a Typical Neuron



Dendrite: Detects information and sends it to cell body

Cell Body: Maintains growth of the cell

Axon: Conducts messages away from cell body and signal to next neuron.

## **6. How does phototropism occur in plants?**

### **Solution:**

Directional movement and growth of plant in response to light is called as phototropism. Phototropism occurs due to increased auxin on the dark side and decreased auxin on the illuminated side. Because of presence of more auxin, leaf in the darker side grows faster causing it to bend towards the source of light.

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

### **Solution:**

In case of a spinal cord injury, signals coming from the nerves as well as the signals coming to the receptors will be disrupted. Both these signals meet in a bundle in the spinal cord. Hence, both these signals get disrupted.

## **8. How does chemical coordination occur in plants?**

### **Solution:**

Plant growth, development and responses to the environment is controlled and coordinated by a special class of chemical substances known as hormones. Hormones are produced in one part of the plant and are transported to all the needy parts of the plant. 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.

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

### **Solution:**

There are various organs in an organism. These organs must be carefully controlled and coordinated for the survival of an organisms. In the body of an organism various fluids are secreted from the glands of the endocrine system. These hormones are responsible for the overall growth and development of an organism. All others daily decision that includes voluntary and involuntary action are controlled by central nervous system (CNS).



Coordination is needed for all human activities we perform. Our nervous system receives information from surroundings which is processed and response is elicited. The endocrine system (hormonal system) helps in integrating various metabolic activities like reproduction, development, and all reflex actions (cope up with various give up situations).

The hormonal system in plants helps in process of photosynthesis; they need carbon dioxide, water and sunlight. The stomatal opening in leaves opens up to allow in carbon dioxide gas, the roots bend towards water and the stem grows towards sunlight, the tendrils in climbing plants are supported by the hormonal system of the plant body.

Thus, we have need of control and coordination system in an organisms.

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

**Solution:**

<b>Reflex actions</b>	<b>Involuntary actions</b>
1. Rapid automatic responses to a stimulus without the conscious involvement of the brain	1. Occurs without the consciousness of an organism
2. Controlled by spinal cord	2. Controlled by mid brain or medulla oblongata
3. Very quick and instantaneous	3. Relatively slower
4. May involve any muscle or a gland	4. Involves only smooth muscles
5. Can be conditioned	5. Cannot be influenced by external conditioning
Examples: Blinking of eyes, salivation	Examples: Beating of heart, blood circulation

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

**Solution:**

	<b>Nervous control</b>		<b>Hormonal Control</b>
1	It is consist of nerve impulses between PNS, CNS and Brain.	1	It consists of endocrine system which secretes hormones directly into blood.

2	Here response time is very short.	2	Here response time is very long.
3	Nerve impulses are not specific in their action.	3	Each hormone has specific actions.
4	The flow of information is rapid.	4	The flow of information is very slow.

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

**Solution:**

Sl. no	Movement in sensitive plants		Movement in our legs
1	The movement in a sensitive plant is a response to stimulus (touch) which is an involuntary action.	1	Movement in our legs is a voluntary action.
2	No special tissue is there for the transfer of information	2	A complete system CNS and PNS is there for the information exchange.
3	Plant cells do not have specialized protein for movements.	3	Animal cells have specialized protein which help muscles to contract.