

## Biology Class 10 Control and coordination

### Answer The Following Question.

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

**Solution :** Difference between reflex action and walking:

| Reflex action                   | Walking                        |
|---------------------------------|--------------------------------|
| (a) Take place without thought. | (a) Takes place after thought. |
| (b) Controlled by spinal cord.  | (b) Controlled by cerebellum.  |
| (c) It is involuntary action    | (c) It is a voluntary action.  |

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

**Solution :** A very small gap that occurs between the last portion of axon of one neuron and the dendron of the other neuron is known as a synapse. It acts as a one way valve to transmit impulses in one direction only. This uni-direction transfer of impulses occurs as the chemicals are produced in only one side of the neuron i.e., the axon's side. From axon, the impulses travel across the synapse to the dendron of the other neuron.

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

**Solution :** Cerebellum, a part of hindbrain is responsible for maintaining posture and equilibrium of the body.

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

**Solution :** The thinking part of our brain is the forebrain. It has separate areas that are specialized for hearing, smelling, sight, taste, touch, etc. The forebrain also has regions that collect information or impulses from the various receptors. When the smell of an

incense stick reaches us, our forebrain detects it. Then, the forebrain interprets it by putting it together with the information received from other receptors and also with the information already stored in the brain.

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

**Solution :** Reflex actions are sudden responses, which do not involve any thinking. For example, when we touch a hot object, we withdraw our hand immediately without thinking as thinking may take time which would be enough to get us burnt. 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 called a reflex arc. The reflex arcs —connections present between the input and output nerves — meet in a bundle in the spinal cord.

Reflex arcs are formed in the spinal cord and the information (input) reaches the brain. The brain is only aware of the signal and the response that has taken place. However, the brain has no role to play in the creation of the response.

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

**Solution :** Plant hormones or phytohormones are naturally-occurring organic substances. These are synthesized in one part of the plant body (in minute quantities) and are translocated to other parts when required. The five major types of phytohormones are auxins, gibberellins, cytokinins, abscisic acid, and ethylene.

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

**Solution :** Difference between movement of leaves of sensitive plants and movement of shoot towards light :

| Movements of leaves of sensitive plants                                        | Movement of a shoot towards light                                      |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1. It is not a growth movement.                                                | 1. It is a growth movement.                                            |
| 2. It is a nastic movement which does not depend on the direction of stimulus. | 2. It is a tropic movement which depends on the direction of stimulus. |

**8. Give an example of a plant hormone that promote growth.**

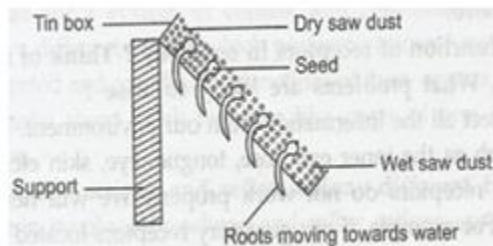
**Solution :** Auxin promotes growth of cells.

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

**Solution :** When tendrils come in contact of any support, the part of the tendril in contact does not grow as rapidly as the part away from the object due to auxin secreted moves away from the object in contact. This rapid growth on one side causes tendril to circle around the object.

**10. Design an experiment to demonstrate hydrotropism.**

**Solution :** Take a tin box with hole at bottom. Fill it with moist saw dust. Sow some gram seeds in it. Keep the tin box in tilted position. When seeds start germinating, water the saw dust only in lower side of the tin box. You will observe that the radicle move towards the wet saw dust. This shows that root is positively hydrotropic.



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

**Solution :** The chemical coordination is maintained by hormones. These are secreted by endocrine glands. These hormones are poured into blood through which they reach the target tissue or organ to act.

### **12. Why is the use of iodised salt advisable?**

**Solution :** Iodine is necessary for the thyroid gland to make thyroxin hormone. In case, iodine is absent in our diet, there is a possibility of Goitre. Iodised common salt contains proper content of iodine. To avoid deficiency of iodine, iodised salt is recommended.

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

**Solution :** When adrenaline reaches the various target organ through blood. All these organs respond together to enable our body to deal with situation like running away from scary situation. When adrenaline reaches the heart, it beats faster to supply more oxygen to our muscles. The small arteries around digestive system and skins contracts to divert the blood towards muscles. All these response enable our body to deal with situation.

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

**Solution :** Diabetes is caused due to non or less secretion of hormone insulin by pancreas. In such person, the blood sugar level is high. Insulin converts extra sugar present in blood into glycogen. Patients suffering from diabetes are given insulin injection to control their blood sugar level.

### **15. Which of the following is a plant hormone?**

- (a) Insulin
- (b) Thyroxin
- (c) Oestrogen

(d) Cytokinins

**Solution :** (d) Cytokinin.

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

(a) Dendrite

(b) synapse

(c) axon

(d) impulse

**Solution :** (b) Synapse.

**17. The brain is responsible for**

(a) thinking

(b) regulating the heartbeat.

(c) balancing the body

(d) all of above.

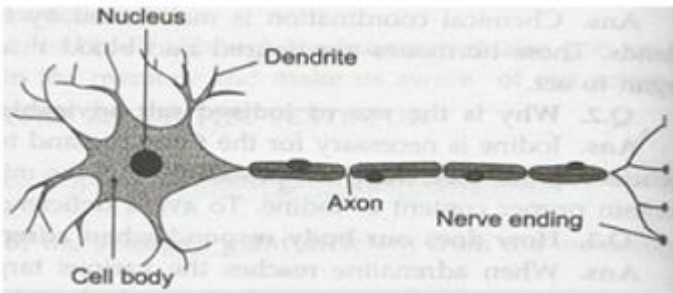
**Solution :** (d) All the above.

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

**Solution :** Receptors detect all the information from our environment. These receptors are located in our sense organs. In case any of the receptors do not work properly we will not be able to perceive that particular information.

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

**Solution :** Neuron acquires particular information through dendrite located on its cell body. This information is then passed on to the axon. Finally, axon ending passes the information into next neuron at the synapse. As soon as the impulse reaches the dendrite, an electrical impulse is generated due to certain chemical changes in neuron. When the impulse reaches axon ending some chemicals released which pass on the impulse to next neuron. These chemicals are known as neurotransmitters.



**20. How phototropism does occur in plants?**

**Solution :** Movement of shoot towards light is called phototropism. This movement is caused due to more growth of cells towards the shaded side of the shoot as compared to the side of shoot towards light. More growth of cells is due to secretion of auxin towards the shaded side.

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

**Solution :**

- (i) Reflex action
- (ii) Impulses from various body parts will not be conducted to brain.
- (iii) Message from brain will not be conducted to various organs.

**22. How does chemical coordination occurs in plants?**

**Solution :** In animals, control and coordination occur with the help of nervous system. However, plants do not have a nervous system. 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.

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

**Solution :** 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.

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

**Solution :** Difference between involuntary and reflex actions is as follows:

| <b>Involuntary actions</b>                                                                                                                                                                | <b>Reflex actions</b>                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| It is a set of muscles movement over which we do not have control. Such actions are controlled by brain. For example- contraction of muscle of our digestive tract, beating of heart etc. | It is rapid, spontaneous and involuntary activity that is produced in response to a stimulus. It is controlled by spinal cord. Example- removal of hand with jerk when someone touches a hot object. |

**25. Compare and contrast nervous system and hormonal control and coordination in animals.**

**Solution :** Difference between nervous control and hormonal control:

| <b>Nervous control</b>                                                               | <b>Hormonal control</b>                                                                                      |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| (i) Consists of nerve impulses conducted by neurons from one organ to another organ. | (i) It consists of endocrine system which secretes chemical messenger's hormones secreted directly in blood. |
| (ii) Nervous impulses produce rapid short lasting responses.                         | (ii) Hormones produce longer lasting responses.                                                              |
| (iii) Nervous impulses are not specific in their action.                             | (iii) Action of hormones is highly Specific.                                                                 |

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

**Solution :** Difference between movement in a sensitive plant and movement in our legs:

| <b>Movement in sensitive plant</b>                                          | <b>Movement in our legs</b>                                                                                            |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| (i) There is no specialized tissue in plants for conduction of information. | (i) There is specialized nervous tissue in animals for conduction of information and muscle cells to help in movement. |
| (ii) Plant cells change shape by changing the amount of water in them.      | (ii) Muscle cells contract or relax to effect movement.                                                                |
| (iii) Plant cells do not have specialized proteins.                         | (iii) Muscle cells have specialized protein which help muscles to contract or relax.                                   |