Control and Coordination 7

Very Short Answer Type Questions (1 mark each)

Q. 1. List two body functions that will be affected if cerebellum gets damaged.
[CBSE, Term 1, Set 1, 2016]

Ans. Two body functions that will be affected if cerebellum gets damaged are equilibrium and posture.

Q. 2. Name one plant hormone which inhibits growth. Write its one more function.
[CBSE, Term 1, Set 2, 2015]

Ans. Abscisic acid is a plant hormone which functions mainly as a growth inhibitor.
(i) It promotes the dormancy in seeds and buds.
(ii) It promotes the closing of stomata.
(iii) It promotes the wilting and falling of leaves.

Short Answer Type Questions-I (2 marks each)

Q. 1. List two different functions performed by pancreas in our body.
[CBSE Delhi, Set 3, 2019]

Ans. **(i)** Pancreas makes two hormones i.e., insulin and glucagon that regulates blood sugar level.
(ii) It secretes pancreatic juice which contains enzymes that aids in the digestion of food.

Q. 2. (a) Name one gustatory receptor and one olfactory receptor present in human beings.
(b) Write a and b in the given flow chart of neuron through which information travels as an electrical impulse.

Dendrite → **a** → **b** → **End point of Neuron**

[CBSE, 2018]

Ans. **(a)** Tongue is the gustatory receptor present in the human body.
(b) Dendrite → **Cell body** → **Axon** → End point of Neuron

Q. 3. Name the plant hormones responsible for the following functions:
(i) growth of the stem
(ii) promotes cell division
(iii) wilting of leaves
(iv) inhibits growth
[CBSE, Term 1, Set 1, 2015]

Ans.

Function	Hormone responsible
(i) Growth of the stem	Auxin or Gibberellin
(ii) Promotes cell division	Cytokinin
(iii) Wilting of leaves	Abscisic acid
(iv) Inhibits growth	Abscisic acid

Short Answer Type Questions-II (3 marks each)

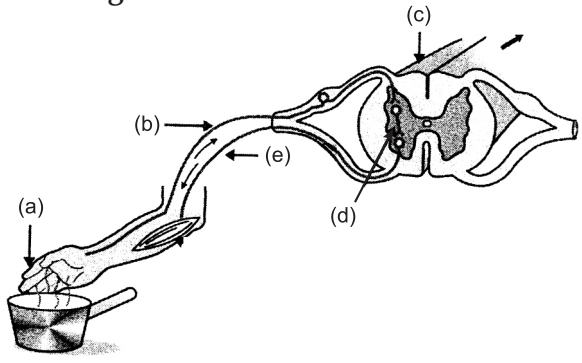
Q. 1. A squirrel is in a scary situation. Its body has to prepare for either fighting or running away. State the immediate changes that take place in its body so that the squirrel is able to either fight or run?
[CBSE Delhi, Set 1, 2020]

Ans. The squirrel body is relied only on electrical impulses *via* nerve cells, the range of tissues instructed to prepare for the coming activity would be limited. On the other hand, if a chemical signal were to be sent as well, it would reach all cells of the body and provide the wide range of changes needed. This is done using a hormone called adrenaline that is secreted from the adrenal glands.

Q. 2. Why is chemical communication better than electrical impulses as a means of communication between cells in a multicellular organism?
[CBSE Delhi, Set 1, 2020]

Ans. Chemical coordination is better than electrical impulses as a means of communication between the cells in a multi- cellular organism because in animals, the messages are communicated in the form of nerve impulses quickly. But still, there are some limitations to the nervous system. Nerve impulses can reach only those cells which are connected by the nervous tissues and the cells connected by nervous tissues, after generation and transmission of the impulse, take some time to rest before the generation and transmission of new impulse. In simple words, cells cannot continuously generate and transmit nerve impulses. This is the reason why most multicellular organisms use another form of control and coordination, named chemical coordination. The advantage of chemical coordination is that the information spreads out throughout the body by blood (then the required part picks it up as per its requirement) and the effect generally lasts longer.

Q. 3. Name the parts (a) to (e) in the following diagram.



What is the term given to the sequence of events occurring in the diagram?

[CBSE Delhi, Set 3, 2020]

Ans. **(a)** Receptors
(b) Sensory neuron
(c) Spinal cord (CNS)
(d) Relay neuron
(e) Motor neuron

Reflex arc is the term given to the sequence of events occurring in the diagram.

Q. 4. (a) What is tropism?
(b) How do auxins promote the growth of a tendril around a support?

[CBSE Delhi, Set 3, 2020]

Ans. **(a)** When the direction of external stimulus decides the direction of response in the form of growth it is called tropism. Thus, tropism is the directional growth movement of a plant part. It can be in the direction of the stimulus or away from the stimulus.

(b) Auxin is a plant growth hormone which is synthesized at the tip of the shoot. It helps the cell grow longer. When a tendril comes in contact with a support, auxins stimulates faster growth of the cells on the opposite side that's why the tendril forms a coil around the support and in this way auxins promote the growth of the tendril around a support.

Q. 5. Trace the sequence of events which occur when a bright light is focused on your eyes. **[CBSE Delhi, Set 1, 2019]**

Ans. When bright light is focussed on our eyes it goes to brain, the brain reverts back the message by motor neuron which contracts the pupil. The sequence of events which occur is as follows:

Receptor → Sensory neuron → Brain

↓

Pupil contraction ← Eye muscles ← Motor neurons

Q. 6. What are plant hormones? Name the plant hormones responsible for the following:

(i) Growth of stem
(ii) Promotion of cell division
(iii) Inhibition of growth
(iv) Elongation of cells

[CBSE Delhi, Set 1, 2019]

Ans. In plants, growth, development and response to the environment are controlled and coordinated by a special class of chemical substances known as phytohormones. They are synthesised in minute amounts.

(i) Gibberellins **(ii)** Cytokinins
(iii) Abscisic acid **(iv)** Auxins

Q. 7. What is feedback mechanism of Hormonic regulation. Take the example of insulin to explain this phenomenon. [CBSE Delhi, Set 2, 2019]

Ans. It is the mechanism by which the amount of any chemical increases or decreases resulting in secretion of the related hormones controlling many cell activities. So they are very important for homeostasis and most hormones are regulated by feedback mechanisms. A feedback mechanism is a loop in which a product feeds back to control its own production. Most hormone feedback mechanism involves negative feedback loops. Negative feedback keeps the concentration of a hormone within a narrow range.

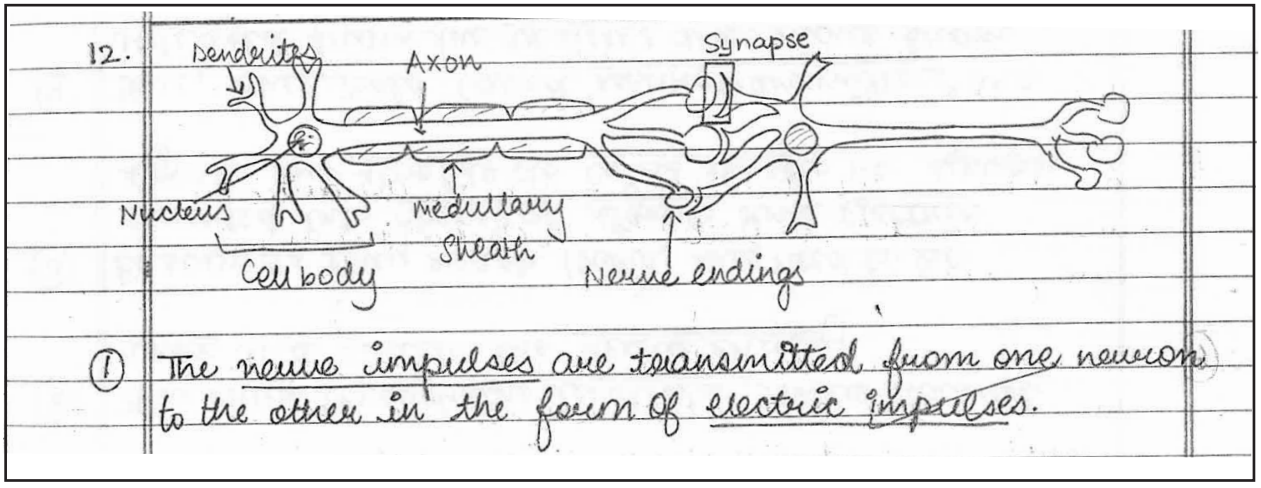
For example, The control of blood sugar by insulin is an example of a negative feedback mechanism. When blood sugar rises, receptors in a body sense a change. In turn the control center secretes insulin into the blood effectively lowering the blood sugar level.

Q. 8. Nervous and hormonal systems together perform the function of control and coordination in human beings. Justify this statement with the help of an example. [CBSE Delhi, Set 3, 2019]

Ans. The nervous system controls and coordinates all the functions in the body. It carries out its function in close coordination with hormonal system. Nerves don't reach every hook and corner of body, hence needs assistance from hormones to control all the parts of body. Nervous control is faster and hormonal control is slower. Hormonal control is based on feedback mechanism and tells body to pace up or slow down. Nervous control is on other hand a direct control. Example – In situation of iodine deficiency hypothalamus releases hormones to stimulate pituitary gland, it further sends stimulating hormone to thyroid gland to secrete thyroxine that regulates carbohydrates metabolism.

Q. 9. Why does the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron take place but not in the reverse direction? Explain. [CBSE, 2019]

Topper's Answers



Q. 10. Name the hormones secreted by the following endocrine glands and specify one function of each:

(a) Thyroid
(b) Pituitary
(c) Pancreas [CBSE, 2018]

Answer: 9

(a) Thyroid gland :- Thyroxine hormone
Thyroxine hormone helps in metabolism of carbohydrates, fats and proteins and is thus responsible for best balanced body growth

(b) Pituitary gland :- Growth hormone
It regulates growth and development of body. However, its reduced secretion causes 'dwarfism' and excess secretion causes 'gigantism'.

(c) Pancreas — Insulin
Insulin regulates the blood sugar level & brings back the excess sugar level to normal.

Ans. **(a)** Thyroid gland secretes thyroxine. It regulates the metabolism and blood pressure of human beings.

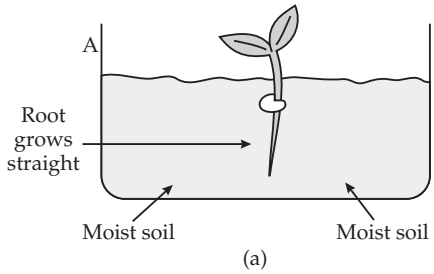
(b) Pituitary secretes growth hormone. It helps the bones and other body organs to grow properly.

(c) Pancreas secretes insulin. Insulin helps to lower blood sugar level.

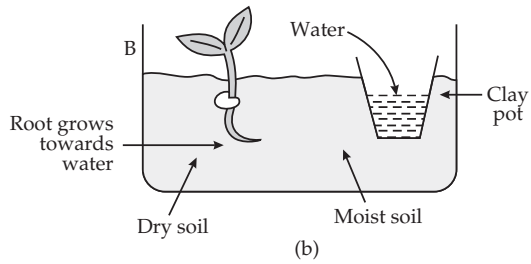
Q. 11. Design an experiment to demonstrate hydrotropism.

[CBSE, Term 1, Set 1, 2016]

Ans. Experiment to demonstrate hydrotropism in Plants:



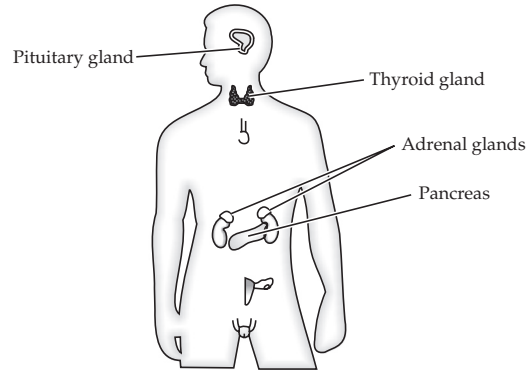
(a) In presence of water



(b) In absence of water

Q. 12. Draw a diagram showing the correct positions of pancreas, thyroid gland, pituitary gland, Adrenal gland in human being. **[CBSE, Term 1, Set 1, 2016]** **[CBSE, Term 1, Set 1, 2015]**

Ans.



Q. 13. State the function of receptors in our body. Think of any three situations where receptors in the body do not work properly. Mention the problems which are likely to arise.

[CBSE, Term 1, Set 2, 2015]

Ans. A receptor is a cell (or a group of cells) in a sense organ which is sensitive to a particular type of stimulus such as light, sound, smell, taste, heat, pressure, etc. The different sense organs contain receptors for detecting different stimuli.

When receptors do not work properly, the environmental stimuli are not able to create nerve impulses and the body does not responds.

When receptors are damaged, the external stimuli transferring signals to the brain are not felt.

For example,

(i) During fever, taste buds do not work properly and as a result, taste of the food eaten is not felt properly. Thus, enzyme secretion is also affected.

(ii) When a person is suffering from a cold, the nostrils are filled with mucus. Then smell of the surrounding is not felt properly. This is due to interruption in reacting to the sense of smell by the olfactory receptor.

(iii) When skin receptors are damaged, and we accidentally touch a hot object, then our hands might get burnt as the damaged receptor cannot perceive the external stimuli of heat and pain.

Q. 14. Name any three glands associated with digestion in humans. Write the names of enzymes secreted by them.

[CBSE Delhi, Term 1, Set 1, 2015]

Ans. Salivary glands, Pancreas and gastric glands are associated with digestion in humans.

S. No.	Glands	Enzymes
1.	Salivary glands	Salivary amylase
2.	Pancreas	Pancreatic amylase Trypsin Lipase
3.	Gastric glands	Pepsin

Long Answer Type Questions (5 marks each)

Q. 1. (a) Why is the use of iodised salt advisable? Name the disease caused due to deficiency of iodine in our diet and state its one symptom.

(b) How do nerve impulses travel in the body? Explain.

[CBSE OD, Set 1, 2019]

Ans. (a) Iodised salt is advisable because iodine is necessary for the formation of thyroxine hormone by thyroid gland. Goitre is the disease caused due to its deficiency.

Symptom: The neck of the person appears to be swollen due to the enlargement of thyroid gland.

(b) Two neurons are not joined to one another completely. There is a small gap between a pair of neuron. This gap is called synapse. The nerve impulse are carried out to this gap by the help of neuro-transmitter (chemical substance). The conduction of nerve impulse through the synapse takes place in the form of electrical nerve impulse. When a stimulus acts on the receptor, an electrical impulse is produced with the help of chemical reaction. This electrical impulse passes through the synapse and then to the other neuron. Thus, in this way nerve impulses travel in the body.

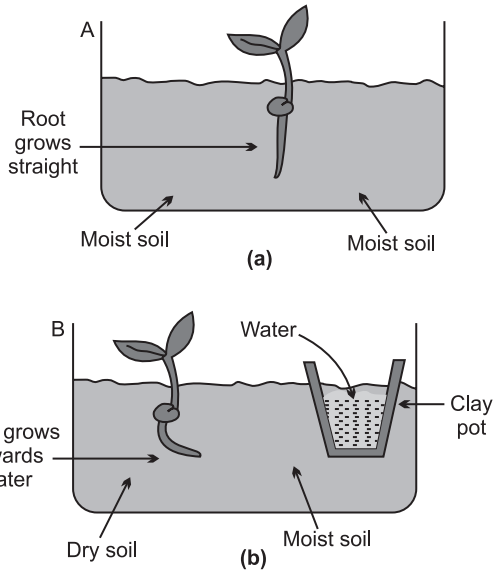
Q. 2. What is hydrotropism? Design an experiment to demonstrate this phenomenon.

[CBSE OD, Set 1, 2019]

Ans. The movement of root of plants towards water is called hydrotropism.

Take two glass troughs A and B. Fill each one of them two-third with soil. In trough A plant a tiny seedling (figure (a)). In trough B plant a similar seedling and also a small 'clay pot' is placed inside the soil (figure (b)). Water the soil in trough

A daily and uniformly. Do not water the soil in trough B but put some water in the clay pot buried in the soil. Leave both the troughs for a few days.



Now, dig up the seedlings carefully from both the trough without damaging their roots. We will find that the root of seedling in trough A is straight. On the other hand, the root of seedling in trough B is found to be bent to the right side (towards the clay pot containing water) figure (b). This can be explained as follows:

In trough A, the root of seedling gets water from both sides (because the soil is watered uniformly) in trough B, the roots gets water oozing out from the clay pot which is kept on the right side. So, the root of seedling in trough B grows and bends towards the source of water to the right side. The experiment shows that the root of a plant grows towards water. In other words, the root of a plant is positively hydrotropic.

Q. 3. (a) Define reflex action. State its significance.

(b) How do plants respond to external stimuli? [CBSE, Term 1, Set 2, 2015]

Ans. (a) A reflex action is an automatic response to a stimulus. The simplest form of response in the nervous system is reflex action. This is a rapid, automatic response to a stimulus which is not under the voluntary control of the brain. It is described as an involuntary action. The pathway taken by nerve impulses in a reflex action is called the reflex arc.

Reflex actions are the actions which we perform without thinking to protect ourselves. For example, coughing is a reflex action which clears our windpipe. The pupils of our eyes get smaller in bright light. This reflex action protects the retina of our eyes from damage due to much light. The pupils of our eyes gets bigger in dim light so as to help us see properly even in dim light.

(b) Plants respond to external stimuli such as light, touch, etc. A growth movement of a plant part in response to an external stimulus in which the direction of stimuli determines the direction of response is called tropism.

(i) If the growth of a plant part is towards the stimuli, it is called positive tropism.

(ii) If the growth of a plant part is away from the stimulus, then it is called negative tropism.

Types of tropism:

(i) The movement of a plant part in response to light is called phototropism.

(ii) The movement of a plant part in response to gravity is called geotropism.

(iii) The movement of a plant part in response to chemicals is called chemotropism.

(iv) The movement of a plant part in response to water is called hydrotropism.

(v) The directional growth movement of a plant part in response to the touch of an object is called thigmotropism. Nasties (or Nastic Movements). The movement of a plant part in response to an external stimulus in which the direction of response is not determined by the direction of stimulus is called nastic movement.

(vi) The folding up of the leaves of a sensitive plant on touching is an example of nastic movement. Here the stimulus is touch.

(vii) The opening up of the petals of dandelion flowers in morning in bright light and closing in the evening when the light fades is an example of nastic movement. In this case the stimulus is light.