



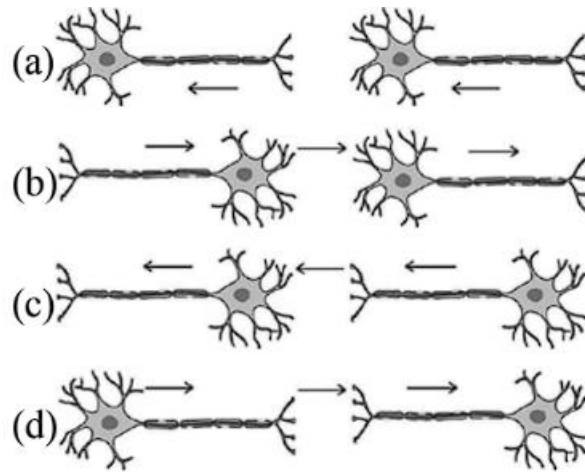
CLASS: X	DEPARTMENT: SCIENCE 2026-2027 SUBJECT: BIOLOGY	DATE: 18/08/2026
WORKSHEET:3	TOPIC: CONTROL AND COORDINATION	NOTE: A4 FILE FORMAT
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I. OBJECTIVE TYPE QUESTIONS (1 MARK)

1. The growth of tendril in pea plant is due to which of the following? (CBSE 2026)
 - (a) Effect of chemotropism
 - (b) Effect of gravity
 - (c) Rapid growth of part of the tendril away from the point of contact with the support (object)
 - (d) Rapid growth of the part of the tendril in contact with the support (object)
2. Identify the hormone that regulates carbohydrate, protein and fat metabolism in the body: (CBSE 2026)
 - (a) Growth hormone
 - (b) Adrenaline
 - (c) Thyroxin
 - (d) Testosterone
3. Which of these is the correct sequence of information in the reflex arc?
 - (a) Sensory Neuron → Receptor → Motor Neuron → Relay Neuron → Effector
 - (b) Receptor → Sensory Neuron → Relay Neuron → Motor Neuron → Effector
 - (c) Sensory Neuron → Receptor → Motor Neuron → Relay Neuron → Effector
 - (d) Effector → Motor Neuron → Relay Neuron → Sensory Neuron → Receptor
4. A person with a damaged cerebellum would likely experience:
 - (a) Memory loss
 - (b) Inability to coordinate and stand properly
 - (c) Loss of hearing

(d) Inability to swallow food

5. What is the correct direction of flow of electrical impulses?



6. The main effect of Cytokinin in plants is to:

- (a) Improve fruit quality
- (b) Promote cell division
- (c) Regulate stomata
- (d) Increase internode length

7. Coordination through the nervous system differs from that produced by the endocrine system because the nervous system:

- (a) Is quick, precise, and localised.
- (b) Is slower and more pervasive.
- (c) Does not require conscious activity.
- (d) Has long-lasting effects.

8. The growth of the pollen tubes towards ovules is an example of:

- (a) Phototropism
- (b) Hydrotropism
- (c) Geotropism
- (d) Chemotropism

9. Organisms depend on hormones as well as electric impulses for the transmission of signals from brain to rest of the body. What can be a likely advantage of hormones over electric impulses?

- (a) It is secreted by all types of cells present in the body.
- (b) It is secreted by stimulated cells and reaches all cells of the body.
- (c) It is relayed to the target organ at a faster rate than electric impulses.
- (d) It does not depend on an external stimulus to be generated in the cells.

10. Identify the gland in our body whose over-secretion will result in giant-sized children.

(CBSE-2026)

- (a) Pituitary
- (b) Thyroid
- (c) Adrenal
- (d) Pancreas

11. When we touch the leaves of “touch-me-not” plant, they began to fold up and droop. How does the plant communicate the information of touch?

- (a) The plant uses electrical signals to transfer information from external environment to cells.
- (b) The plant uses electrical-chemical signals to transfer information from cell to cell.
- (c) The plant uses electrical-chemical signals to transfer information from tissue to specialised cells.
- (d) The plant uses electrical signals to transfer information from cell to specialised tissues.

For the following questions, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii), and (iv) as given below.

- (i) Both A and R are true and R is the correct explanation of the assertion.
- (ii) Both A and R are true but R is not the correct explanation of the assertion.
- (iii) A is true but R is false.
- (iv) A is false but R is true

12. Assertion(A): Reflex actions do not involve thinking.

Reason(R): Most reflex actions are controlled by the spinal cord.

13. Assertion(A): In our actions of writing or talking, our nervous system communicates with the muscles.

Reason (R): Cranial nerves and spinal nerves form the peripheral nervous system.

14. Assertion (A): Plant hormones are chemicals produced in plants which help to coordinate growth, development and response to stimulus and environment.

Reason (R): Absciscic acid is a plant hormone that promotes cell division.

15. Assertion (A): Activities like walking in a straight line, riding a bicycle and picking up a pencil require coordination by the cerebellum.
Reason (R): It is responsible for precision of voluntary actions and maintaining the posture and balance.
16. Assertion (A): Digestion is a voluntary action.
Reason (R): Involuntary actions are controlled by the mid-brain and hind-brain.

II. VERY SHORT ANSWER TYPE QUESTIONS (2 MARKS):

17. Identify the stimulus responsible for each of the following tropic movements:
i) Phototropism
ii) Geotropism
iii) Chemotropism
iv) Hydrotropism
18. List any two body functions that would be affected if the cerebellum is damaged.
19. Define a neuron. Name the part of the neuron:
i) that receives information or stimuli.
ii) where the nerve impulse is converted into a chemical signal before being transmitted to the next neuron.
20. What are phytohormones? Name:
i) one plant hormone that promotes growth.
ii) one plant hormone that inhibits growth.
21. A potted plant kept near a window bends towards the light after a few days. Explain how auxins bring about this bending of the plant stem.
22. Why do muscle cells change their shape in response to a nerve impulse? Explain how this enables body movement.

III. SHORT ANSWER TYPE QUESTIONS: (3MARKS)

23. What is a synapse? Explain how a nerve impulse is generated in a neuron and describe the role of the synapse in transmitting the impulse from one neuron to another.
24. A squirrel suddenly spots a predator nearby. To survive, its body quickly prepares for either fight or flight. State the immediate changes that occur in its body to help it respond to this situation.
25. Compare the nervous mechanism and the hormonal mechanism of control and coordination. List three differences between them.
26. The leaves of a Mimosa pudica (touch-me-not) plant fold when touched, whereas the shoot of a plant bends towards light. How is the movement of the leaves of Mimosa pudica different from the movement of a shoot towards light?

IV. LONG ANSWER QUESTIONS (5 M)

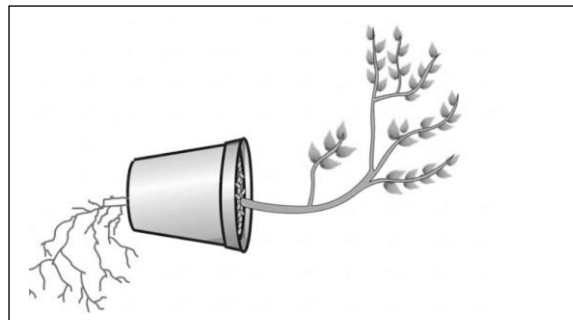
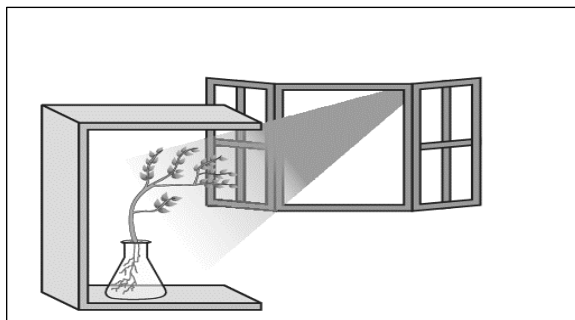
27. Draw a neat, labelled diagram of the human brain and label the following parts:

Cerebrum
Cerebellum
Medulla oblongata
Spinal cord
Pituitary gland

28. What is a reflex action? With the help of a labelled reflex arc diagram, explain the sequence of events that occurs when a person accidentally touches a hot object.

V.CASE STUDY QUESTIONS (4M)

29. A student performed an experiment using freshly germinated bean seeds placed on a wire mesh over a conical flask filled with water. The setup was kept inside a cardboard box with one side open towards a window, allowing light to enter from only one direction. After a few days, the shoots bent towards the light, while the roots grew away from the light. The flask was then rotated so that the shoots faced away from the light and the roots faced towards it. After a few more days, it was observed that the older parts of the shoot and root remained unchanged, but the newly grown portions changed their direction of growth.



- Name the type of tropic movement shown by the shoot in this experiment.
- Why did only the newly grown portions of the shoot and root change their direction after the flask was rotated?
- Which plant hormone is responsible for the bending of the shoot towards light?
- State one conclusion that can be drawn from this experiment regarding the response of plants to light.

30. Rohan, 15, is much shorter than his peers, while his friend Aryan is exceptionally tall. Concerned, their parents consult a doctor who diagnoses Rohan with growth hormone deficiency, leading to dwarfism, and Aryan with excessive growth hormone, causing gigantism.

Meanwhile, their classmate Ananya experiences rapid physical changes like height increase and voice modulation due to puberty-related hormonal changes. The doctor explains that growth hormone from the pituitary gland regulates height, while testosterone in boys and estrogen in girls drive puberty.

- a) Name the hormones secreted by the following endocrine glands and specify one function of each: i) Thyroid ii) Pancreas.
- b) Name the hormones that are released in human males and females when they reach puberty.
- c) Name the endocrine gland which secretes growth hormone. What will be the effect of the following on a person
 - i) deficiency of growth hormone
 - ii) excess secretion of growth hormone?

OR

- c) How does chemical coordination take place in animals?

VI. BOARD QUESTIONS.

31. The plant hormone whose concentration stimulates the cells to grow longer on the side of the shoot which is away from the light is: (2024-25)

- (a) Cytokinin
- (b) Gibberellins
- (c) Adrenaline
- (d) Auxin

32. (a) Name the glands that secrete: (2024-25)

- (i) Adrenaline
- (ii) Thyroxin

(b) Explain with example how the timing and amount of hormone released are regulated in the human body.

33. Trace the sequence of events, which occur in our body when a bright light is focused on eyes.

34. What is 'hydrotropism'? Describe an experiment to demonstrate 'hydrotropism'.

35. (a) (i) What are the limitations of electrical impulses in multicellular organisms? (CBSE-2026)

(ii) (I) How do plants convey information from cell to cell? Compare it with that of animals.

(II) Name the type of movement shown by the growth of pollen tube towards an ovule.

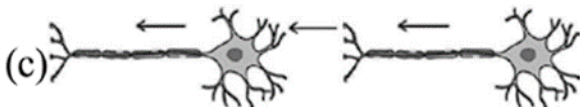
36. (i) Reflex arcs have evolved in animals because the thinking process of the brain is not fast enough for all situations. Draw a flow chart showing the path of a reflex arc.

(ii) Given below are some actions/activities. Identify the part of the brain involved in controlling them:

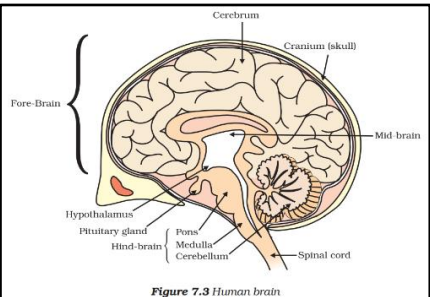
(I) Taking a walk in the garden

(II) Dancing

(III) Blood pressure

Q.No	Answers
I	OBJECTIVE TYPE QUESTIONS (1 MARK)
1.	(c) Rapid growth of part of the tendril away from the point of contact with the support (object)
2.	(c) Thyroxin
3.	(b) Receptor → Sensory Neuron → Relay Neuron → Motor Neuron → Effector
4.	(b) Inability to coordinate and stand properly
5.	 (c)
6.	(b) Promote cell division
7.	(a) Is quick, precise, and localised.
8.	(d) Chemotropism
9.	(b) It is secreted by stimulated cells and reaches all cells of the body.
10.	(a) Pituitary
11.	(b) The plant uses electrical-chemical signals to transfer information from cell to cell.
12.	i) Both A and R are true and R is the correct explanation of the assertion.
13.	ii) Both A and R are true and R is not the correct explanation of the assertion.
14.	iii) A is true but R is false.
15.	(i) Both A and R are true and R is the correct explanation of the assertion.
16.	(iv) A is false but R is true.
II.	VERY SHORT ANSWER (2MARKS):
17.	(i) Phototropism – Light (ii) Geotropism – Gravity (iii) Chemotropism – Chemicals (iv) Hydrotropism – Water
18.	• Precision of voluntary actions. (Walking in a straight line, Picking up a pencil) • Maintaining the posture and balance of the body.
19.	A neuron is a specialised cell designed to transmit information in the form of electrical impulses. (i) Dendritic tip (dendrite) (ii) Axon end (axon terminal)
20.	Phytohormones (plant hormones) are chemical substances produced naturally in plants in very low concentrations. They regulate a wide variety of physiological processes such as growth, development, and responses to environmental stimuli. Growth promoter- Auxin, Cytokinin Growth inhibitor- Absciscic acid
21.	The bending of plant towards light is known as phototropism. It is due to plant hormone auxins. When the growing parts of a phototropic plant detect sunlight, auxins (synthesized at

	the shoot tips) help the cells grow longer. When light falls on one side of the plant, the auxins generally diffuse towards the shaded side of the shoot. This stimulates the cells in the shaded area to grow longer than the corresponding cells of the illuminated region. This results in the curvature of the plant stem tip towards the light.												
22.	Muscle cells have special proteins that change both their shape and their arrangement in the cell in response to nervous electrical impulses. When this happens, new arrangements of these proteins give the muscle cells a shorter form. Thus, muscle contraction brings about body movement.												
III.	SHORT ANSWER TYPE QUESTIONS: (3M)												
23.	Synapse is the functional gap or junction between two adjacent neurons or nerve cells, i.e., between axon ending of one and the dendrite of the next. Transmission of Nerve Impulse- The information acquired at the end of the dendritic tip of a neuron sets off a chemical reaction which creates an electrical impulse. This impulse travels from the dendrite to the cyton along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals (neurotransmitters), which cross the synapse and start a similar electrical impulse in a dendrite of the next neuron. In this way nerve impulses travel in the body. Synapse helps in transmitting impulses from one neuron to another.												
24.	Adrenaline is secreted directly into the blood and carried to different parts of the body. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in supply of more oxygen to our muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our skeletal muscles. The liver releases more glucose into the blood to provide additional energy. The breathing rate also increases because of the contractions of the diaphragm and the rib muscles. All these responses together enable the animal body to be ready to deal with the situation.												
25.	<table><tr><th>Nervous mechanism</th><th>Hormonal mechanism</th></tr><tr><td>Uses electrical impulses to transmit messages.</td><td>Uses chemical substances called hormones.</td></tr><tr><td>Quick, precise and localised response.</td><td>Slower, widespread and long-lasting response.</td></tr><tr><td>Messages are transmitted through nerve cells.</td><td>Hormones are secreted into the blood and carried to target organs.</td></tr><tr><td>The effects are short-lived.</td><td>It has prolonged effects.</td></tr></table>			Nervous mechanism	Hormonal mechanism	Uses electrical impulses to transmit messages.	Uses chemical substances called hormones.	Quick, precise and localised response.	Slower, widespread and long-lasting response.	Messages are transmitted through nerve cells.	Hormones are secreted into the blood and carried to target organs.	The effects are short-lived.	It has prolonged effects.
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26.	The movement of the leaves of Mimosa pudica is independent of growth. The plant uses electrical-chemical means to convey information from cell to cell. Plant cells change shape by changing the amount of water in them, resulting in swelling or shrinking. The movement of a shoot towards light is caused by growth. When growing plants detect light, 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.												
	Basis of difference	Movement of leaves of a sensitive plant	Movement of a shoot towards light										

	Stimulus	Touch or contact.	Light.
	Speed of action	Very quick, happens within seconds.	Slow, happens over a period of time.
	Direction	Non-directional, as the movement is not dependent on the direction of the stimulus.	Directional, as the shoot bends towards the source of light.
	Basis of movement	Caused by a change in the water content of the cells in the pulvinus at the base of the leaf, which leads to swelling or shrinking.	Caused by the action of the plant hormone auxin, which promotes cell elongation on the shaded side, causing the stem to bend towards the light.
IV.	LONG ANSWER QUESTIONS (5 M)		
27.	 <i>Figure 7.3 Human brain</i>		
28.	Reflex action is a sudden, involuntary response to a stimulus. Most reflex actions are controlled by the spinal cord. <u>Components of a reflex arc:</u> 1.Receptor: It is present in the sense organs of the body and receives information and generates impulses. 2. Sensory neuron (Afferent): Carries information from the receptor to the interneurons in the spinal cord. 3.Interneuron (Relay neuron): Processes the information and generates responses. 4.Motor neuron (Efferent) Carries the information from the spinal cord to the effector organ. 5.Effector organ: Receives the information from the efferent neuron and shows the appropriate responses.		
V.	CASE STUDY QUESTIONS (4M)		
29.	a) Phototropism		

	b) The older parts had already completed their growth. Growth-related movement occurs only in the newly growing portions. c) Auxin d) Plants respond to light by growing towards it. This growth is directional and occurs due to differential growth caused by auxin.
30.	a) i) Thyroid- Thyroxine, Thyroxine regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth ii) Pancreas-Insulin, helps in regulating blood sugar levels. b) Male- Testosterone, Female- Oestrogen c) Pituitary gland secretes growth hormone. i) Deficiency of growth hormone- Dwarfism ii) Excess secretion of growth hormone- Gigantism OR c) Chemical coordination takes place in animals with the help of hormones. Hormones are the chemical messengers that are secreted by the glands of the endocrine system. Hormones regulate the overall growth and development of the animals.
VI	BOARD QUESTIONS
31.	(d) Auxin
32.	(a) (i) Adrenal gland (ii) Thyroid gland (b) The feedback mechanism regulates the timing and amount of hormone to be secreted. For example, if the sugar level in blood rises, they are detected by the cells of the pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced. If there is a fall in the blood sugar level below normal, it stimulates the secretion of glucagon. Glucagon stimulates the breakdown of glycogen to glucose, and thus the normal sugar level is maintained.
33.	Sequence of events: - Bright light falls on retina. - Receptors detect the stimulus. - Sensory neuron carries impulse to brain. - Brain processes the information. - Motor neuron carries impulse to iris muscles. - Circular muscles contract. - Pupil becomes smaller. Receptor → Sensory neuron → Brain → Motor neuron → Eye → Eye muscle contracts.
34.	Hydrotropism is the directional growth or movement of a plant part in response to water. The roots of plants typically grow toward water, making it an example of positive hydrotropism. Experiment to demonstrate hydrotropism Procedure: - Take a porous clay pot and fill it with water. - Place the clay pot in a tub containing dry sand. - Sow a freshly germinated pea in the dry sand near the clay pot.

	4. Leave the setup undisturbed for a few days. Observation: - You will notice that the root of the pea seedling grows and bends towards the porous clay pot containing water, and not straight downwards into the dry sand. Conclusion: - Since the root grows towards the source of water, this experiment demonstrates that roots are sensitive to water and exhibit a directional growth response, which is called hydrotropism.
35.	(a)(i) The limitations of electrical impulses are: They reach only those cells that are connected by nervous tissue, not each and every cell in the animal body. Once an electrical impulse is generated and transmitted, the cell takes some time to reset its mechanisms before generating another impulse. Cells cannot continually create and transmit electrical impulses. (ii)(I) Plants use electrical-chemical means to convey information from cell to cell, but unlike animals, there is no specialised tissue in plants for the conduction of information. Animals have specialised nervous tissue made up of neurons for conducting information through electrical impulses. (II) Chemotropism
36.	(i) Reflex arc flow chart Stimulus → Receptor → Sensory neuron → Relay neuron (Spinal cord) → Motor neuron → Effector → Response (ii) (I) Taking a walk in the garden → Cerebrum (II) Dancing → Cerebellum (III) Blood pressure → Medulla (hind-brain)

Prepared by:
Ms Shruti Mukundan

Checked by:
HOD Science