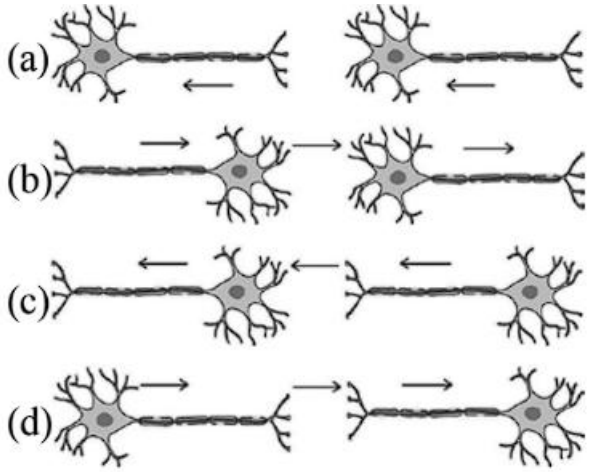
INDIAN SCHOOL AL WADI AL KABIR		
CLASS: X	**DEPARTMENT: SCIENCE 2025 – 2026** **SUBJECT: BIOLOGY**	**DATE: 28.08.2025**
WORKSHEET:4	**TOPIC: CONTROL AND COORDINATION**	**NOTE: A4 FILE FORMAT**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I. OBJECTIVE TYPE QUESTIONS:

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



2. What would happen to the person if the cerebellum of his brain is damaged?

(a) He will lose his memory.

(b) He will not be able to swallow food properly.

(c) He will be unable to coordinate and stand properly.

(d) He will lose his power of vision and hearing.

3. Find out the plant growth inhibitor phytohormone.

(a) Auxin

(b) 2,4 D

(c) Cytokinin

(d) Abscisic acid

4. Coordination through the nervous system tends to differ 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.

5. 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.

6.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

7. Junction between two neurons is called:

(a) Cell junction

(b) Neuromuscular junction

(c) Neural joint

(d) Synapse

8. Which statement is not true about thyroxine?

(a) Iron is essential for the synthesis of thyroxine.

(b) It regulates carbohydrates, protein and fat metabolism in the body

(c) Thyroid gland requires iodine to synthesize thyroxine.

(d) Thyroxine is also called thyroid hormone.

9. 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.

10. The main effect of cytokinin in plants is to:

(a) Improve the quality of fruits.

(b) Prevent the growth of lateral buds.

(c) Regulate opening and closing of stomata.

(d) Increase the length of internodes on flowering stems.

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

11. Assertion(A): Reflex actions are automatic and provide rapid responses to stimuli.
Reason(R): These actions are controlled by brain.

12.Assertion(A): A receptor is a specialised group of cells in a sense organ that perceive a particular type of stimulus.
Reason (R): Different sense organs have different receptors for detecting stimuli.

13. Assertion (A): Activities like walking in a straight line, riding a bicycle, picking up a pencil are controlled by cerebellum.
Reason (R): It is responsible for precision of voluntary actions and maintaining the posture and balance.

14. Assertion (A): Plant hormones are chemicals produced in plants which help to coordinate growth, development and response to stimulus and environment.
Reason (R): Abscisic acid is a plant hormone that promotes cell division.

II. VERY SHORT ANSWER (2M):

15. What is the stimulus in:
i) Phototropism ii) Geotropism iii) Chemotropism iv) Hydrotropism

16.List two body functions that would be affected if cerebellum is damaged.

17. Define neuron. Name the parts of the neuron where:
i) information is acquired.
ii) impulse must be converted into chemical signal for onward transmission.

18. What are phytohormones? Name one plant hormone that promotes growth and another plant hormone which inhibits growth?

19. Explain how auxins help in bending of plant stem towards light.

20. Why do muscles change their shape in response to a nerve impulse?

III. SHORT ANSWER TYPE QUESTIONS: (3M)

21.What is synapse? In a neuron cell how is an electrical impulse created and what is the role of synapse in this context?

22. 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?

23. List three points of difference between nervous and hormonal mechanism for control and coordination
24. How is the movement of leaves of a sensitive plant (e.g., *Mimosa pudica*) different from the movement of a shoot towards light?

IV. LONG ANSWER QUESTIONS (5 M)

25. Draw the diagram of human brain and label its parts.

26. What is meant by reflex-action? With the help of a labelled diagram, trace and explain the sequence of event which occurs when we touch a hot object.

V.CASE STUDY QUESTIONS (4M)

27. 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.

28. 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

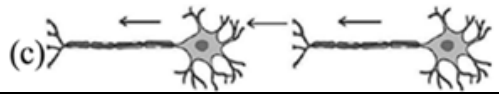
29. (a) Name the glands that secrete: (2024-25)

(i) Adrenaline
(ii) Thyroxin

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

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

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

Q.No	Answers
1.	 (c)
2	(c) He will be unable to coordinate and stand properly.
3.	(d) Abscisic acid
4.	(a) Is quick, precise, and localised.
5.	(b) It is secreted by stimulated cells and reaches all cells of the body.
6.	(b) Receptor → Sensory Neuron → Relay Neuron → Motor Neuron → Effector
7.	(d) Synapse
8.	(a) Iron is essential for the synthesis of thyroxine.
9.	(b) The plant uses electrical- chemical signals to transfer information from cell to cell.
10.	(d) Increase the length of internodes on flowering stems.
11.	iii) A is true but R is false.

12.	i) Both A and R are true and R is the correct explanation of the assertion.
13.	i) Both A and R are true and R is the correct explanation of the assertion.
14.	iii) A is true but R is false.
II.	**VERY SHORT ANSWER (2M):**
15.	i) Light ii) Gravity iii) Chemicals iv)Water
16.	a) Walking in a straight line b) Picking up a thing from the ground.
17.	Neuron is a structural and functional unit of nervous system. These cells are specialized for conducting information in the form of electrical impulses from one part of the neuron to another. i) Dendrites ii) Axon terminal
18.	Phytohormones 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- Abscisic acid
19.	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.
20.	In order to cause the movement of muscles, muscles change their shapes and arrangement in cell in response to nervous impulse. The new arrangement of proteins thereby, give the muscle cells a shorter form and move in direction according to the mind.
III.	**SHORT ANSWER TYPE QUESTIONS: (3M)**
21.	Synapse is the junction between two adjustment neuron 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.
22.	Adrenaline hormone is secreted in large amount when a squirrel is in scary situation and the following changes takes place in its body so that squirrel is able to fight or run: (i)The heartbeat rate increases. (ii)The breathing rate increases (iii) More glucose goes into blood to release energy which helps squirrel run away.
23.	**Nervous system** 1. Transmits information through electrical impulses. 2. Signal transmission is fast. 3. The effects are short-lived. 4. Affects only a particular part of the body.

Hormonal system

1.Transmits information through blood cells.
2. Signal transmission is slow.
3. It has prolonged effects.
4. Affect different organs of the body.

24.

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)**

25.

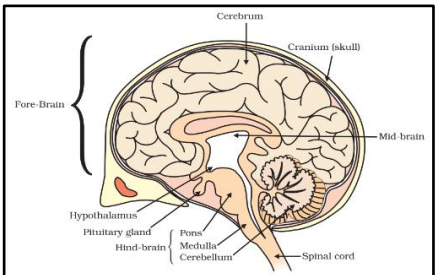


Figure 7.3 Human brain

26. Any sudden, immediate, involuntary, and mechanical response to a stimulus that is done without the will of the body is called reflex action. Mostly these reactions are controlled by the spinal cord.

Components of a reflex arc:

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.

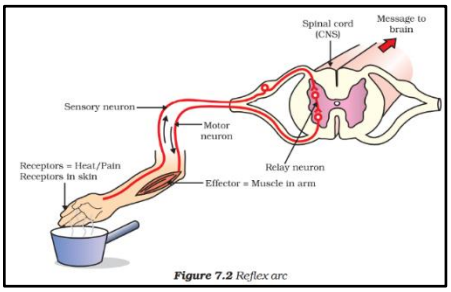


Figure 7.2 Reflex arc

	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)**
27.	a) i) Thyroid- Thyroxine, Thyroxin 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 fluid that are secreted by the glands of the endocrine system. Hormones regulate the overall growth and development of the animals.
VI	**BOARD QUESTIONS**
28.	(d) Auxin
29.	(a) (i) Adrenal (ii) Thyroid (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.
30.	Light focussed on eyes - Stimulus sensed and received by receptors in the eyes - sensory nerves take the stimulus in form of impulse to the spinal cord - Decision taken by spinal cord - stimulus transferred to motor neurons from the spinal cord to the eye muscles - Muscles contract - eyes respond by blinking and shutting eyes **Receptor —> Sensory neuron —> Brain —> Motor neuron —> Eye —> Eye muscle contracts.**
31.	***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:** 1. Take a porous clay pot and fill it with water. 2. Place the clay pot in a tub containing dry sand. 3. Sow a freshly germinated pea seedling 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.

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