

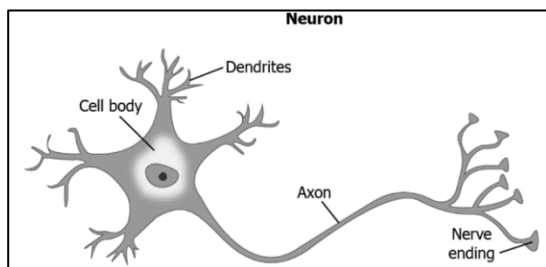


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| CLASS: X | DEPARTMENT: SCIENCE 2023 - 2024 | DATE: 16.11.23 |
| WORKSHEET:7 | TOPIC: CONTROL AND COORDINATION | NOTE: A4 FILE FORMAT |
| NAME OF THE STUDENT: | CLASS & SEC: | ROLL NO. |

I. OBJECTIVE TYPE QUESTIONS:

1. 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.

2. The image shows the structure of a neuron.



How will information travel within a neuron?

- (a) Dendrite → cell body → axon → nerve ending
- (b) Dendrite → axon → cell body → nerve ending
- (c) Axon → dendrite → cell body → nerve ending
- (d) Axon → cell body → dendrite → nerve ending

3. 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.

4. 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

5. Which of these health conditions is caused by a hormonal imbalance in the body?

- (a) Scurvy
- (b) Typhoid
- (c) Diabetes mellitus
- (d) Common cold

6. A plant bends towards the source of light when exposed to the light on only one side. Which of the following is the best explanation of the phenomena.

- (a) It needs light for photosynthesis.
- (b) The apices of their stems are attracted by light.
- (c) Some auxin accumulates on the shaded side to induce greater cell elongation on that side.
- (d) Light stimulates the cells on the illuminated side to increase in length.

7. Which part in human brain controls the balance of human body?

- (a) Cerebrum
- (b) Cerebellum
- (c) Optic lobes
- (d) Spinal cord

8. Which of the following acts as both endocrine and exocrine glands?

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

9. The growth of tendrils in pea plant is due to:

- (a) Effect of light
- (b) Effect of gravity
- (c) Rapid cell division in tendrillar cells in contact with the support.
- (d) Rapid cell divisions in tendrillar cells that are away from the support.

10. Growth of pollen tube towards ovule is due to:

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

11. 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

12. Assertion (A): Brain plays a secondary role in reflex action when hand touches a hot object.

Reason (R): In reflex action, the stimulus received by the spinal cord sends the response. The action is registered in the cerebral brain for memory.

13. Assertion(A): Transmission of the nerve impulse across a synapse is accomplished by neurotransmitters.

Reason(R): Transmission across a synapse usually requires neurotransmitters because there is small space i.e., synaptic cleft, that separates one neuron from another.

14. Assertion(A): Plants do have a nervous system for control and coordination.

Reason(R): Plants use electro chemical means to convey information from cell to cell.

15. Assertion (A): Insulin regulates blood sugar level.

Reason (R): Insufficient secretion of insulin will cause diabetes.

II. VERY SHORT ANSWER (2M):

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. How does feedback mechanism regulate the hormone secretion?

19. Distinguish between tropic movements and nastic movements in plants. Give examples to illustrate your answer.

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

21. (i) Name the hormones that are released in human males and females when they reach puberty.

(ii) Name a gland associated with brain. Which problem is caused due to the deficiency of the hormone released by this gland?

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

III. SHORT ANSWER TYPE QUESTIONS: (3M)

23. What is synapse? In a neuron cell how is an electrical impulse created and what is the role of synapse in this context?
24. Write one example each of the following tropic movements:
- (i) Positive phototropism
 - (ii) Negative phototropism
 - (iii) Positive geotropism
 - (iv) Negative geotropism
 - (v) Hydrotropism
 - (vi) Chemotropism
25. What is 'hydrotropism'? Describe an experiment to demonstrate 'hydrotropism'.
26. 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?
27. List three points of difference between nervous and hormonal mechanism for control and coordination

IV. LONG ANSWER QUESTIONS (5 M)

28. Draw the diagram of human brain and label its parts.
29. 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.

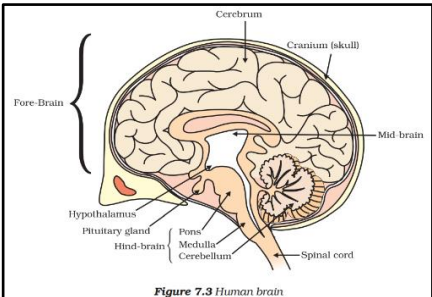
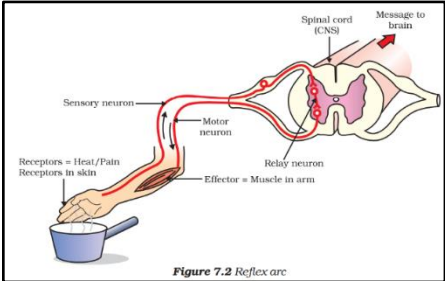
V. CASE STUDY QUESTIONS (4M)

The plants do not have a nervous system and sense organs like eyes, ears, or nose, etc., like the animals, but they can still sense things. The plants can sense the presence of stimuli like light, gravity, chemicals, water, and touch, etc., and respond to them. The plants can sense things like light, gravity, chemicals, water, and touch, etc., by the action of hormones in them. The stimuli like light, gravity, chemicals, water, and touch, etc., are called environmental changes. So, we can also say that the plants coordinate their behaviour against environmental changes by using hormones. They are synthesized at places away from where they diffuse to the area of action and act. The hormones in plants do not act the same way as in animals. The hormones in plants coordinate their behaviour by affecting the growth of a plant. And the effect on growth of the plant can result in the movement of a part of the plant like shoot (stem) or root, etc.

- a) How does control and coordination take place in plants?
 - b) What are phytohormones?
 - c) Where are these hormones synthesised?
- OR
- c) List four types of phytohormones.

| Q.No | Answers | | | | | | |
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| 1. | (a) Is quick, precise, and localised. | | | | | | |
| 2. | (a) Dendrite → cell body → axon → nerve ending | | | | | | |
| 3. | (b) It is secreted by stimulated cells and reaches all cells of the body. | | | | | | |
| 4. | (b) Receptor → Sensory Neuron → Relay Neuron → Motor Neuron → Effector | | | | | | |
| 5. | (c) Diabetes mellitus | | | | | | |
| 6. | (c) Some auxin accumulates on the shaded side to induce greater cell elongation on that side. | | | | | | |
| 7. | (b) Cerebellum | | | | | | |
| 8. | (b) Pancreas | | | | | | |
| 9. | (d) Rapid cell divisions in tendrillar cells that are away from the support. | | | | | | |
| 10. | (d) Chemotropism | | | | | | |
| 11. | (d) Increase the length of internodes on flowering stems. | | | | | | |
| 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. | iv) A is false but R is true | | | | | | |
| 15. | i) Both A and R are true and R is the correct explanation of the assertion. | | | | | | |
| II. | VERY SHORT ANSWER (2M): | | | | | | |
| 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. | 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. | | | | | | |
| 19. | <table border="1"> <thead> <tr> <th>Tropic movements</th> <th>Nastic movements</th> </tr> </thead> <tbody> <tr> <td>Tropic movement is the movement of a plant in response to environmental stimuli.</td> <td>These are non-directional movements of plants in response to the stimulus.</td> </tr> <tr> <td>Example: The upward growth of a plant stem in response to sunlight.</td> <td>Example: The folding up of leaves in response to touch.</td> </tr> </tbody> </table> | Tropic movements | Nastic movements | Tropic movement is the movement of a plant in response to environmental stimuli. | These are non-directional movements of plants in response to the stimulus. | Example: The upward growth of a plant stem in response to sunlight. | Example: The folding up of leaves in response to touch. |
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| Tropic movement is the movement of a plant in response to environmental stimuli. | These are non-directional movements of plants in response to the stimulus. | | | | | | |
| Example: The upward growth of a plant stem in response to sunlight. | Example: The folding up of leaves in response to touch. | | | | | | |
| 20. | 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. | | | | | | |

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| 21. | (i) Testes in males produces hormone testosterone and ovaries in females produces hormone oestrogen. (ii) Pituitary gland present in the brain is responsible for body growth, development of bones and muscles. If there is a deficiency of this hormone in childhood, it leads to dwarfism . Excess of growth hormone leads to Gigantism . |
| 22 | 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) |
| 23. | Synapse is the junction between two adjacent 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. |
| 24. | (i) Positive phototropism: shoots growing towards light. (ii) Negative phototropism: roots growing away from light towards ground. (iii) Positive geotropism: growth of roots towards earth due to the pull of the earth. (iv) Negative geotropism: shoots growing away from the earth. (v) Hydrotropism: roots growing towards the source of water. (vi) Chemotropism: growth of pollen tubes towards the ovules. |
| 25. | ‘Hydrotropism’ is the directional growth of a plant part in response to water. For example, roots show hydrotropism as they grow towards water in the soil and are positively hydrotropic. An experiment to demonstrate hydrotropism is as follows: 1. A porous pot filled with water is taken and inserted in a tub filled with dry sand. 2. A freshly germinated pea seedling is sowed in the sand. 3. As water is not available in sand, the root growing will bend towards the porous pot filled with water. 4. A hydrotropic curvature of the root is observed as it grows towards water. 5. This bending of root shows the movement in response towards water. |
| 26. | 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. |
| 27. | 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. |

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| | <p>2. Signal transmission is slow.</p> <p>3. It has prolonged effects.</p> <p>4. Affect different organs of the body.</p> |
| IV. | LONG ANSWER QUESTIONS (5 M) |
| 28. |  <p style="text-align: center;"><i>Figure 7.3 Human brain</i></p> |
| 29. | <p>Any sudden, immediate, involuntary, and mechanical response to a stimulus that is done without the will of the body is called <u>reflex action</u>. Mostly these reactions are controlled by the spinal cord.</p> <p><u>Components of a reflex arc:</u></p> <ol style="list-style-type: none"> 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.  <p style="text-align: center;"><i>Figure 7.2 Reflex arc</i></p> |
| V. | CASE STUDY QUESTIONS (4M) |
| 29. | <p>a) In plants, control and coordination is brought by means of chemical substances called phytohormones. In addition, environmental factors like water, temperature and light, controls growth and development.</p> <p>b) Phytohormones –Plant growth is regulated by certain chemicals produced naturally in them called phytohormones.</p> <p>c)They are synthesized at places away from where they diffuse to the area of action and act.</p> <p style="text-align: center;">OR</p> <p>c) The five main plants hormones synthesized and secreted by plants are auxins, gibberellins, cytokinins, abscisic acid and ethylene.</p> |

