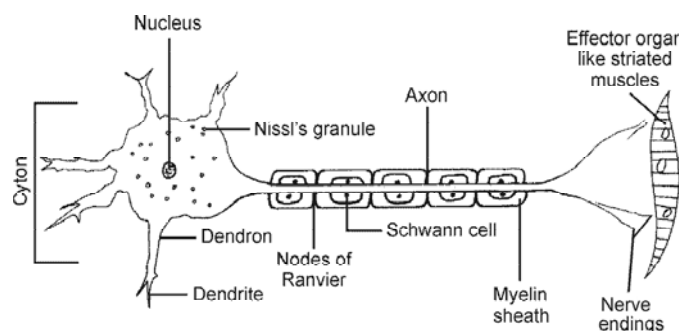


IMPORTANT NOTES

1. **Stimulus** is defined as any change in the external or internal environment of an organism which brings about a response from it.
2. The working together of the various organs in a systematic manner is called **coordination**.
3. Chemical coordination in both plants and animals is responsible for growth and development.
4. The plant movement which is dependent on growth, is called **tropic movement** or **tropism**.
5. The type of movement which is independent of growth is called **nastic movement**.
6. The plants use electro-chemical means to convey the information from cell to cell.
7. In plants, there is no specialised tissue for the conduction of information, unlike animals.
8. Movement of a plant or its parts due to light is called **phototropism**.
9. Movement of a plant or its parts due to water is called **hydrotropism**.
10. Movement of a plant or its parts due to gravity is called **geotropism**.
11. Certain chemical substances in plants necessary for growth are plant hormones also called phytohormones.
12. Some of the hormones stimulate plant growth while others act as growth inhibitors. For this reason, plant hormones are often referred to as **growth regulators**.
13. Five main groups of growth regulators are auxin, gibberellin, cytokinin, ethylene and abscisic acid.
 - auxin stimulates cell elongation and growth.
 - gibberellin stimulates growth and flowering.
 - cytokinin stimulates cell division and chlorophyll retention.
 - abscisic acid is a growth inhibitor and brings about fall in leaves and fruits.
14. The coordinated activity of an organism depends on the continuous input of information for the internal and external environment.
15. Animals possess a number of sense organs to perceive different sensations.
16. The functional junction between nerves is called **synapse**.
17. In animal, the nervous system controls and coordinates various functions in the body.
18. **NERVES**
 - Sensory Nerves (carry messages from the sense organs to the brain)
 - Motor nerves (carry messages from the brain to the effector organs like muscles/ glands)
 - Mixed Nerves (function as both sensory and motor nerves)
19. Brain is the ultimate coordinator of the body. The three parts of the brain are:
 - (a) **Fore-brain** mainly consists of cerebrum, the largest and the specialised portion of the brain. It is further divided into four parts:
 - (i) frontal lobe controlling muscular activities.
 - (ii) parietal lobe controlling touch, smell, etc.
 - (iii) temporal lobe controlling hearing.
 - (iv) occipital lobe controlling vision.
 - (b) **Mid-brain** controls a few motor activities.
 - (c) The **hind-brain** is in turn made of
 - (i) cerebellum, deals with coordination of postures.
 - (ii) pons varolii, controlling respiration and its regulation.
 - (iii) medulla oblongata regulates reflexes like swallowing, coughing, etc.
20. The brain being an extremely delicate organ is well protected by the cranium or the brain box, three coverings called 'meninges' and a fluid in between the meninges called the cerebrospinal fluid.
21. The functional unit of the nervous system is the neuron, whose structure can be detailed as follows :



22. Reflex actions are unconscious or involuntary responses of the effector organs to a stimulus, which is monitored through the spinal cord. The route thus taken by the impulse (i.e., from the receptor organs to the spinal cord) and the response thereof (i.e., from the spinal cord to the effector organs) is known as the reflex arc. Sneezing, coughing, withdrawal of the hand upon touching a hot object are examples of **reflex action**.
23. Hormones are chemical substances secreted in trace amounts by endocrine glands and are the means of information transmission.
24. The hormones in animals show following characteristic features:
- They are synthesised by endocrine glands.
 - They are produced at a place other than the site of action. They travel through blood to other parts where they cause changes.
 - They are secreted directly into the blood stream.
 - They act on specific tissues or organs. The tissues or organs that respond to the hormones are called as **target organs**. For

example, the target organs for the hormone adrenaline includes the heart.

- They are secreted in response to changes in the external or the internal environment of the body and are also called **chemical messengers**.
 - They may stimulate or inhibit the activity of the target organ, thus **regulating** its activity.
 - They are effective in **minute quantities**, often in trace amounts which are difficult to detect at times.
 - Excess** or **deficiency** of a hormone may lead to serious consequences.
25. The chemical messengers of our body are the hormones produced by the endocrine system. Hormones are carried by the blood to their target organs where they bring about appropriate actions.
26. The master endocrine gland of the body is the pituitary gland also known as the hypophysis. Hypophysis is in turn under the control of hypothalamus—a part of the brain located at the base of cerebrum.

27. Endocrine glands, their hormones and functions

Endocrine glands	Hormones	Functions
Hypothalamus	Releasing hormones	Regulation of the secretion of hormones from pituitary glands.
Pituitary (hypophysis)	(i) Growth hormones (ii) Trophic hormones (iii) Prolactin (iv) Vasopressin (v) Oxytocin	Development of bones and muscles. Regulation of the secretion of hormones from endocrine gland like adrenal, thyroid, testes and ovary. Regulation of function of mammary glands. Regulation of water and electrolyte balance. Regulation of the ejection of milk during lactation.
Thyroid	Thyroxin	Regulation of metabolism of carbohydrate, fat and protein.

Endocrine glands	Hormones	Functions
Parathyroid Adrenal	Calcitonin Adrenaline and Corticoids	Regulation of blood calcium and phosphate. Regulation of blood pressure, heart rate, carbohydrate metabolism and mineral balance.
Pancreas	(i) Insulin, (ii) Glucagon	Lowering of blood glucose. Increase of blood glucose.
Testes	Testosterone	Regulation of male accessory sex organs and secondary sexual characters like moustache, and voice.
Ovary	(i) Estrogen (ii) Progesterone	Regulation of female accessory sex organs and secondary sexual characters like mammary gland, hair pattern and voice. Maintenance of pregnancy.

ASSIGNMENTS FOR SUMMATIVE ASSESSMENT

I. VERY SHORT ANSWER QUESTIONS

(1 Mark)

A. IMPORTANT QUESTIONS

- What is a ganglion?
- Define nerve impulse.
- Define synapse.
- How does an impulse travel through a neuron, what exactly is happening?
- Name the coverings in brain and the fluid present in between.
- What is the function of medulla oblongata?
- What is the function of cyton in a neuron?
- Name the neuron which carry impulses from the spinal cord to the effector.
- Which part of the brain is the seat of consciousness, thinking and stimulates interpretation?
- What are the environmental triggers that can change the direction of growth in plants?
- Why does response occur?
- What is the main characteristic of “touch me not” plant?
- How are the plant responses reflected?
- What is tropic movement?
- What are the two main kinds of coordination present in living organisms?
- What is nastic movement?
- Name one chemical substance of plant which promotes ripening of fruits.
- Write the full form of ABA.
- Which gland is known as master gland?
- What is known as “fight or flight” hormone?
- Deficiency of which hormone causes goitre?
- What causes gigantism?
- Write down two functions of testis.
- Name two ovarian hormones.
- Name the hormone that regulates protein metabolism and body growth.

B. QUESTIONS FROM CBSE EXAMINATION PAPERS

- Mention one example of chemotropism.
[2010 (T-I)]
- Mention the function of hind brain in humans.
[2010 (T-I)]
- Name and explain the function of the hormone secreted by the pituitary gland in humans.
[2010 (T-I)]
- State the main function of abscisic acid in plants.
[2010 (T-I)]
- Name the plant hormone responsible for the promotion of cell division.
[2010 (T-I)]
- Which hormone is injected to a diabetic patient and why?
[2010 (T-I)]

- | | |
|---|--|
| <p>7. Name the hormone secreted by an endocrine gland during emergency? Name the gland which secretes this hormone. [2010 (T-I)]</p> <p>8. What will happen if intake of iodine in our diet is low? [2010 (T-I)]</p> <p>9. What do we call the movement of shoot towards light? [2010 (T-I)]</p> <p>10. Name the plant hormone responsible for elongation of cells. [2010 (T-I)]</p> <p>11. Which part of the brain controls posture and balance of the body? [2010 (T-I)]</p> <p>12. Define 'chemotropism'. [2009]</p> <p>13. Which of the following actions on touch is an example of chemical control? Movement on touch a sensitive plant. Movement in human leg. [2009]</p> <p>14. A young green plant receives sunlight from one direction only. What will happen to stem and roots? [2009]</p> <p>15. Name two tissues that provide control and coordination in multicellular animals. [2009]</p> <p>16. In our bodies what is the function of thyroxine hormone? [2009]</p> <p>17. Name the endocrine gland that secretes insulin in our bodies. [2009]</p> <p>18. Name the main hormone secreted by thyroid gland and state its one function. [2009]</p> | <p>19. Name the plant hormone that retards growth of the plant. [2009]</p> <p>20. What is the function of hormone secreted by the endocrine gland, pituitary? [2008]</p> <p>21. Name the hormone the secretion of which is responsible for dramatic change in appearance in girls when they approach 10-12 years of age. [2008]</p> <p>22. Which endocrine gland secretes the growth hormone? [2008]</p> <p>23. What is neuron? [2007]</p> <p>24. What is phytohormone? [2007]</p> <p>25. List two functions performed by ovaries in a human female. [2006]</p> <p>26. Name the structural and functional unit of human nervous system. [2004]</p> <p>27. Name the part of the hindbrain which takes part in the regulation of respiration. [2004]</p> <p>28. Write the function of the hormone "thyroxin" in our bodies. [2004]</p> <p>29. Which hormone helps in lowering the level of blood glucose in human beings? [2004]</p> <p>30. Which hormone is responsible for the development of moustache and beard in men? [2004]</p> <p>31. Which type of glands in human body secrete hormones? State any one location for them. [2004]</p> |
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II. SHORT ANSWER QUESTIONS-I

(2 Marks)

A. IMPORTANT QUESTIONS

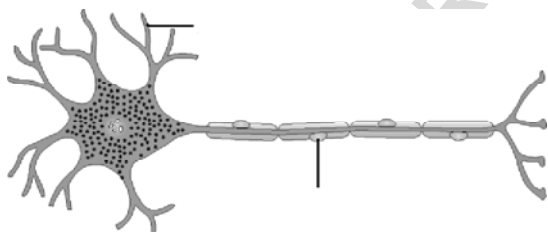
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| <p>1. What exactly is spinal cord and how is it protected?</p> <p>2. Represent the reflex arc with the help of a flow chart.</p> <p>3. What is a cerebrospinal fluid? What is its function?</p> <p>4. What is the difference between auxin and axon?</p> <p>5. What is the significance of reflex action?</p> <p>6. Define 'nerve impulse'. Which structure in a neuron helps to conduct a nerve impulse</p> <p style="padding-left: 20px;">(i) towards the cell body?</p> <p style="padding-left: 20px;">(ii) away from the cell body?</p> <p>7. With which part of the nervous system do you associate the following actions?</p> | <p style="padding-left: 20px;">(a) sensation of smell (b) swallowing</p> <p style="padding-left: 20px;">(c) hearing ability (d) muscular activities</p> <p>8. What do you mean by meninges? What is their function?</p> <p>9. Discuss phototropism.</p> <p>10. Define stimulus.</p> <p>11. What is coordination?</p> <p>12. Name the four plant hormones.</p> <p>13. Suggest a proof that even unicellular organisms like amoeba respond to stimuli. Justify by giving two example that even plants respond to stimuli.</p> <p>14. Name the plant hormones responsible for the following:</p> <p style="padding-left: 20px;">(a) elongation of cells</p> <p style="padding-left: 20px;">(b) growth of stem</p> |
|---|--|

- (c) promotion of cell division
 - (d) falling of senescent leaves.
15. Name the stimulus in:
- (a) Phototropism (b) Chemotropism
 - (c) Hydrotropism (d) Geotropism
16. Why are endocrine glands also referred to as ductless glands?
17. Which two endocrine glands perform dual functions?
18. How do you support the statement that 'pancreas' is the overall controller of the blood glucose level?

19. Name the hormone associated with—
- (a) maintenance of pregnancy
 - (b) regulation of male sex characters
20. Why is pituitary gland called the 'master endocrine gland'?
21. Why is iodised salt necessary for our body?
22. Justify that the pancreas and the gonads perform dual functions.
23. List the functions of testosterone and estrogen.
24. Name the hormones secreted by following endocrine glands:
- (a) Thyroid (b) Pancreas

B. QUESTIONS FROM CBSE EXAMINATION PAPERS

1. Name the two main organs of our central nervous system. Which one of them plays a major role in sending command to muscles to act without involving thinking process? Name the phenomenon involved. [2010 (T-I)]
2. State the role of the brain in reflex action. [2010 (T-I)]
3. How does our body maintain blood sugar level? [2010 (T-I)]
4. What happens at the synapse between two neurons? [2010 (T-I)]
5. Label the parts of a neuron in Figure. [2010 (T-I)]



6. What are the end products formed during fermentation in yeast. Under what condition a similar process takes place in our body that leads to muscle cramps? [2010 (T-I)]
7. Differentiate between tropic and nastic movements in plants. Give one example of each. [2009]
8. Draw the diagram of a nerve cell and label the following on it: [2009]
- (a) Nucleus (b) Dendrites
9. Write the name and the functions of any two parts of the hind brain. [2009]

10. What are 'nastic' and 'curvature' movements? Give one example of each. [2009]
11. What are plant hormones? Write two functions of auxin. [2009]
12. Name the hormones secreted by testis and ovary. Write one function each of these hormones. [2009]
13. (a) Distinguish between voluntary and involuntary actions of our body.
- (b) Choose involuntary actions amongst the following:
Reading, beating of heart, salivation in the mouth on viewing a tasty food, talking. [2008]
14. Name the three major regions of human brain. Which part of brain maintains posture equilibrium of the body? [2008]
15. Explain the cause of shoots of the plant bending towards light. [2008]
16. What is autonomic nervous system? Name the subsystem in which it is subdivided. [2007]
17. Name the two hormones secreted by pancreas. Write one function of each hormone named. [2007]
18. Name the hormone responsible for regulation of :
- (i) metabolism of carbohydrates, fats and proteins.
 - (ii) balance of calcium and phosphate.
 - (iii) blood pressure.
 - (iv) water and electrolyte balance. [2007]
19. Name the main function of 'pituitary gland'. Write the effect of excessive and undersecretion of pituitary gland. [2003]

III. SHORT ANSWER QUESTIONS–II

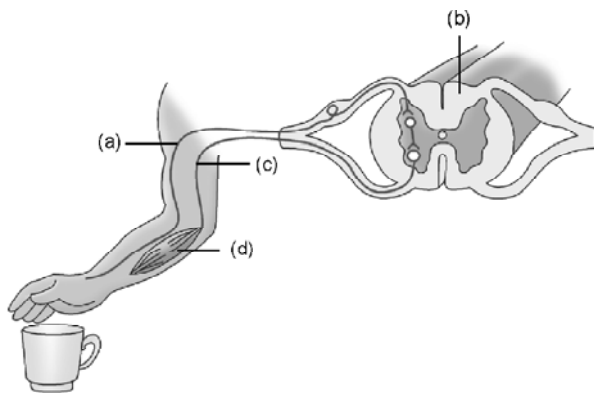
(3 Marks)

A. IMPORTANT QUESTIONS

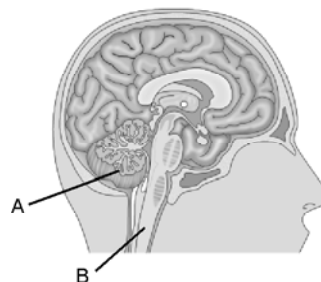
1. Justify that brain is a highly protected organ. Name the most controlled part by each division.
2. Label the parts (a), (b), (c) and (d) and show the direction of flow of electrical signals in figure.
3. Which part of brain is associated with the following:
 - (i) Stimulus interpretation
 - (ii) Movement of tongue
 - (iii) Walking
 - (iv) Muscular movement
 - (v) Respiratory activities
 - (vi) Hunger
4. What is the need for protection of brain? How is brain protected?
5. How does control and coordination take place in plants?
6. Write down the functions of gibberellins, cytokinins and abscisic acid (one of each).
7. Name the functions of some phytohormones.
8. What do you know about phototropism in plants?
9. Name the movement associated with the following:
 - (i) Roots of a plant move downward in the soil.
 - (ii) Plant parts move towards light.
 - (iii) Growth of pollen tube towards the ovule.
 - (iv) Movement of shoot against gravity.
 - (v) Bending of roots of the plants towards water.
 - (vi) Plant part moves away from light.
10. Give any two differences between hormones and enzymes. Describe the endocrine role of pancreas.
11. Name the source gland and give one main action of the following hormones.
 - (i) Prolactin
 - (ii) Calcitonin
 - (iii) Insulin
12. Where are vasopressin and oxytocin produced in human body? Give their functions.

B. QUESTIONS FROM CBSE EXAMINATION PAPERS

1. Name the hormone secreted by thyroid gland. Write its function. Why is it important for us to have iodised salt in our diet? [2010 (T-I)]
2. How does feed-back mechanism regulate the hormone secretion? [2010 (T-I)]
3. Explain how the human body responds when adrenaline is secreted into blood. [2010 (T-I)]
4. Why does the shoot of the plant bend towards light when it is kept inside cardboard box with a small hole. [2010 (T-I)]
5. (a) If the cerebellum is not functioning properly, what are the activities of our body affected?
(b) How do muscle cells move? [2010 (T-I)]
6. If you are happened to touch a hot object, what would be your response? How will it happen? Show it with the help of diagram. [2010 (T-I)]
7. If you keep the potted plant horizontally for 2-3 days, what type of movements would be shown by the shoot and root after 2 or 3 days. Why? [2010 (T-I)]
8. Name various plant hormones. Give one function of each. [2010 (T-I)]
9. Label the parts (a), (b), (c) and (d) and show the direction of flow of electrical signals in the figure given. [2010 (T-I)]
10. Ram has met with an accident after that he lost the capacity to :
 - (i) walk in straight line
 - (ii) smell anything
 - (iii) does not feel full after eating?Which part of brain is damaged in each case? [2010 (T-I)]



11. Compare the nervous and hormonal systems for control and co-ordination in human beings. [2010 (T-I)]
12. (a) Give an example of plant hormone that promotes growth.
 (b) Name a plant hormone that promotes cell division.
 (c) Give an example of plant hormone that inhibits growth. [2010 (T-I)]
13. In a neuron:
 (i) Where do information received?
 (ii) Through what information travels as an impulse?
 (iii) Where does the impulse get converted into chemical signal for outward transmission? [2010 (T-I)]
14. (a) Which hormone is secreted when growing plants detect light?
 (b) Why do plants appear to bend towards light? [2010 (T-I)]
15. (a) How is movement of leaves of touch-me-not plant and movement of plant towards light different?
 (b) Give a suitable example of chemotropism. [2010 (T-I)]
16. With the help of a diagram explain reflex arc and reflex action. [2010 (T-I)]
17. List the names of hormones secreted by the following endocrine glands and mention their functions.
 (i) Thyroid gland (ii) Pituitary gland
 (iii) Adrenal gland [2010 (T-I)]
18. (i) Differentiate between sensory neurons and motor neurons.
 (ii) How is brain protected in our body?
 (iii) Name the part of the brain responsible for precision of voluntary actions and maintaining body posture and balance of the body. [2010 (T-I)]
19. What is tropism? Design an experiment to demonstrate hydrotropism with the help of diagram. [2010 (T-I)]
20. Draw diagram of human brain and label any four parts. Write one function each of any two parts. [2010 (T-I)]
21. What is the function of receptors in human body? What are the types of receptors found in humans? What problems are likely to occur if receptor do not work properly. [2010 (T-I)]
22. Draw a labelled diagram of a Neuron. Explain its functions. [2010 (T-I)]
23. What is endocrine gland? Name any two endocrine glands present in a human body and write hormones secreted by them. [2010 (T-I)]
24. Name the hormone synthesised at the shoot tips. How does it help the plant to response to light? [2010 (T-I)]
25. Tendril encircles or coils around the object in contact with it. Elaborate. [2010 (T-I)]
26. Name the hormone secreted by ovary, testes and adrenal glands. Write a function of each hormone. [2010 (T-I)]
27. What is tropism? Describe the types of tropism. Mention two differences between tropism and nastic movement. [2010 (T-I)]
28. Draw a labelled diagram of the largest cell in the human body. Mention its main functions. [2010 (T-I)]
29. A compound of iodine is compulsorily added to common salt in small quantity.
 (a) Why is it important for us to have iodised salt in our diet.
 (b) Name the disease caused by its deficiency.
 (c) Write our symptoms of the disease. [2010 (T-I)]
30. What is reflex action? Describe the steps involved in reflex action. [2009]
31. What is 'hydrotropism'? Describe an experiment to demonstrate 'hydrotropism'? [2009]
32. What is 'phototropism'? How does it occur in plants? Describe an activity to demonstrate phototropism. [2009]
33. What are 'hormones'? State one function of each of the following hormones: [2009]
 (i) Thyroxin (ii) Insulin
34. In the given diagram of human brain label A and B and write their functions. [2008]



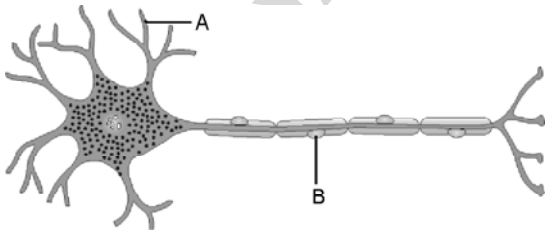
35. Define 'hormones'. Name the hormone secreted by thyroid. Write its function. Why is the use

- of iodised salt advised to us? [2008]
36. Describe the central nervous system in human beings under the following heads:
- regions included
 - three functions of any one region [2006]
37. What are the male and female gonads in human beings? State any two functions of each of them. [2006]
38. Which animal or plant hormone is associated with the following:
- increased sugar level in blood
 - changes at puberty in boys
 - inhibits growth of plants
 - rapid development of fruit
 - dwarfism
 - goitre [2006]
39. Draw a diagram showing endocrine glands in a male body. Label the following glands on it:
- Pituitary
 - Thyroid
 - Adrenal
 - Testes [2005]
40. What is the difference between sensory and motor neurons? Which parts of human brain are responsible for auditory reception and sensation of smell? [2004]
41. Name the two major divisions of the autonomic nervous system in man. In the human body, what is the effect of the following systems. [2004]
- Blood vessels
 - Urinary bladder
42. Define nerve impulse. Which structure in a neuron helps to conduct a nerve impulse :
- towards the cell body
 - away from the cell body [2004]
43. Draw a diagram of human brain and label the following parts:
- Cerebrum
 - Meninges
 - Medulla oblongata
 - Cerebellum [2004]

IV. LONG ANSWER QUESTIONS

(5 Marks)

A. IMPORTANT QUESTIONS

- What are the three major components of the nervous system in animals? How are nerves further classified? What are the three major types of nervous system and how is one different from the other?
- State six reflex actions of the body. Explain how the reflex arc is the same in all of them.
- Give the various parts of nervous system. What is the function of nervous system?
- 
 - Name the parts labelled A and B in the neuron drawn above.
 - Which part acquires the information in the neuron?
 - Through which part does the information travel?
 - In what form does this information travel?
 - Where is the impulse converted into a chemical signal for onward transmission?
- Name the various plant hormones. Also give their physiological effects on plant growth and development.
- Can 'adrenals' be called the 'stress managing glands' of the body? Justify your answer giving five points.
- Suggest any five differences between endocrine and exocrine gland.

B. QUESTIONS FROM CBSE EXAMINATION PAPERS

- Name the hormone which is injected to a diabetic patient.
 - Why should we use iodised salt in our diet?
 - If iodine is insufficient in one's diet, what might be the deficiency disease and its symptoms? [2010 (T-I)]
- What is reflex arc?
 - What are the components of reflex arc?
 - How do muscle cells move? [2010 (T-I)]

3. (a) Draw labelled diagram of human brain.
 (b) What is the function of mid brain.
 (c) Name the three different parts of hind brain and give one function of each. [2010 (T-I)]
4. (a) Name two hormones secreted by pancreas. Write one function of each hormone.
 (b) How does our body respond when alternative is secreted into the blood.
 (c) Write an example to explain feedback mechanism for regulation of hormonal secretion. [2010 (T-I)]
5. (a) Draw the structure of a neuron and label the following on it.
 Nucleus, Dendrite, Cell body and Axon
 (b) Name the part of neuron:
 (i) where information is acquired.
 (ii) through which information travels as an electrical impulse. [2008]
6. (a) What is (i) Phototropism and (ii) geotropism? With labelled diagrams describe an activity to show that light and gravity change the direction that plant parts grow in.
- (b) Mention the role of each of the following plant hormones.
 (i) Auxin (ii) Absciscic acid [2008]
7. (a) What is the reflex action? Give its two examples. Illustrate the pathway followed by a message from the receptor in reflex arc.
 (b) Name the action of sympathetic and parasympathetic nervous system on eye. [2006]
8. (a) What are 'hormones'?
 (b) List four characteristics of hormones.
 (c) Name the hormones required for the following:
 (i) Functioning of memory glands.
 (ii) Regulation of calcium and phosphate in blood.
 (iii) Lowering of blood glucose.
 (iv) Development of moustache and beard in human male. [2006]

ASSIGNMENTS FOR FORMATIVE ASSESSMENT

A. Activity

Objective:

To study the phenomenon of phototropism and geotropism in plants.

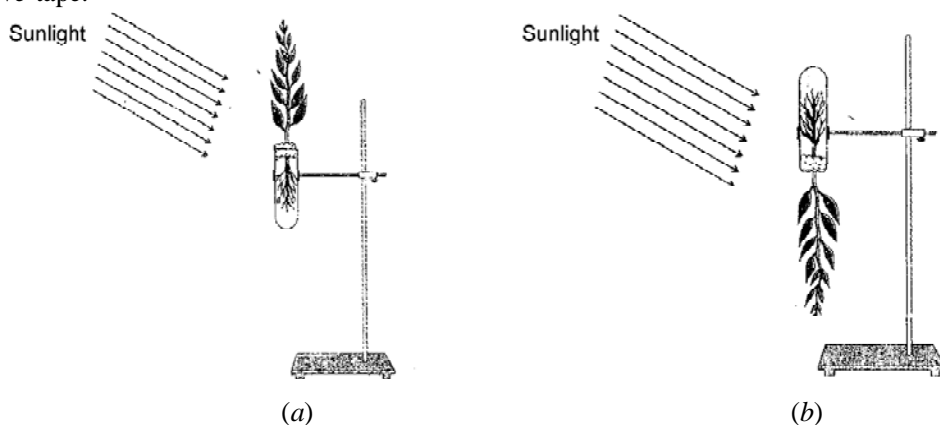
Materials Required:

Two tender undamaged and un-branched plants with roots and leaves (such as seedlings of green gram), two boiling tubes, two laboratory stands with clamps, cotton, and adhesive tape.

Procedure:

- Take two test tubes and mark them as A and B.
- Pour water in both test tubes to about two third heights.
- Take two tender undamaged and un-branched plants with roots and leaves and insert one plant into each test tube.

- Introduce cotton swabs in such a way that root dip in water and stem with leaves project out of the test tube.
- Seal the mouth of two test tubes using additional cotton and adhesive tape such that no water trickles out of the test tube even when they are inverted.
- Fix tube A vertically upright in a laboratory stand as shown in Fig. (a). Fix the other test tube



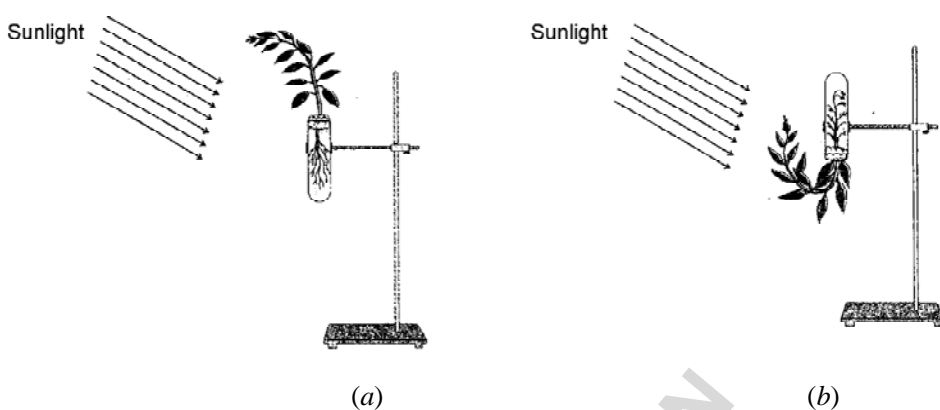
The two plants in the beginning of the experiment on day 1

B upside down in another laboratory stand, as shown in Fig. (b). Ensure that the water in second tube does not trickle down.

- Place these set-ups near a window such that direct sunlight falls on the two plants.

- Observe the plant in each test tube daily (on day 1, day 2, day 3 and day 4).

- Record your observations. Note the direction of growth of stem and primary root. Indicate the features having +ve (or -ve) phototropism and +ve (or -ve) geotropism.



The two plants at the end of the experiment on day 4

Observations:

	Day 1	Day 2	Day 3	Day 4
Plant in test tube A				
Stem				
Root				
Plant in test tube B				
Stem				
Root				

Results and Discussion:

Based on the observations recorded for plants in test tubes A and B, reason out the responses stem and root in the experiment.

The stem in test tube A grows vertically upwards and bends towards the light. The stem in test tube B shows a curvature and bends upwards towards the light and away from the gravitational force, thus showing +ve phototropism and -ve geotropism. Roots in both the test tubes grow downwards thus exhibiting positive geotropism.

B. Quiz

1. Megha took a potted small seedling and kept that horizontally in a lighted area. She left that pot for a few days, taking the precaution that the seedling does not dry. After some days she found that shoot has grown upwards while root has grown downwards. What is the reason behind it?
2. The mother of Mohan has been advised by the

doctor to take less sugar in her diet. Can you tell that from which disease she is suffering and what is the reason behind it?

3. Anita is suffering from cold. She felt that she can not fully appreciate the taste of the food. Can you tell, why might this be happening?
4. Shyam is walking in his village. Suddenly he saw a bull come to him and he run away from that site. Name the hormone secreted in the body of Shyam at that time.

C. Puzzles

1. Look across, up and down in the grid to find the answers of the following questions.
 - (i) Brain is protected by it.
 - (ii) Membranes which surrounded the spinal cord.
 - (iii) The largest part of brain.
 - (iv) Part of hind brain which regulates the respiration.

- (v) The main centre of reflex action.
- (vi) Part of brain responsible for accurate voluntary action.
- (vii) Seat of involuntary activities.

C	O	R	C	E	R	E	B	R	U	M
E	M	N	R	S	P	I	N	U	M	E
R	O	D	A	E	A	O	L	B	S	N
E	F	S	N	S	I	D	S	N	P	P
B	O	E	I	C	E	R	E	N	D	O
E	R	S	U	M	R	D	U	L	U	N
L	E	Y	M	E	N	I	N	G	E	S
L	B	H	Y	P	O	B	C	O	D	R
U	S	P	I	N	A	L	C	O	R	D
M	E	D	U	L	L	A	O	S	D	M

2. Unscramble the following and write down the names of ten such hormones. Sort them as plant and animal hormones.

- (i) INCYXOTO :
- (ii) SINUNIL :
- (iii) XINAU :
- (iv) NOGCAGUL :
- (v) TINLACORP :
- (vi) INSOTYCKIN :
- (vii) LETHYNEE :
- (viii) ONERETOSETST :
- (ix) DANERAENIL :
- (x) LINSLEREBGIB :

D. Group Activities

1. Sit down and cross your leg in such a way that

the upper leg can swing freely. Ask your friend to give you a sharp tap just below the knee cap with the edge of his hand. What feeling do you get?

2. Ask the students to prepare a chart showing human nervous system. They can compare the central and peripheral nervous systems.

E. Seminar

1. **Topic**—Coordination in plants

(**Hints**—Following topics should be covered.)

- 1. Movement independent of growth
- 2. Movement due to growth
- 3. Phytohormones

2. **Topic**—Nervous system in human

(**Hints**—Following topics should be covered.)

- 1. Central nervous system
- 2. Peripheral nervous system
- 3. Autonomic nervous system
- 4. Reflex actions.

F. Debate

Topic—Secretion of hormone is regulated by feedback mechanism.

G. Group Discussions

- 1. How does the brain function?
- 2. Importance of synapse.
- 3. Adrenaline as fight and flight hormone.

H. Survey

- 1. The groups of students (5-6) can go to different areas of city to :
 - (a) find out the children suffering from dwarfism and gigantism.
 - (b) find out the number of people suffering from goitre.
 - (c) find out the number of families using “iodised salt”.

**Question 1:**

What is the difference between a reflex action and walking?

Answer:

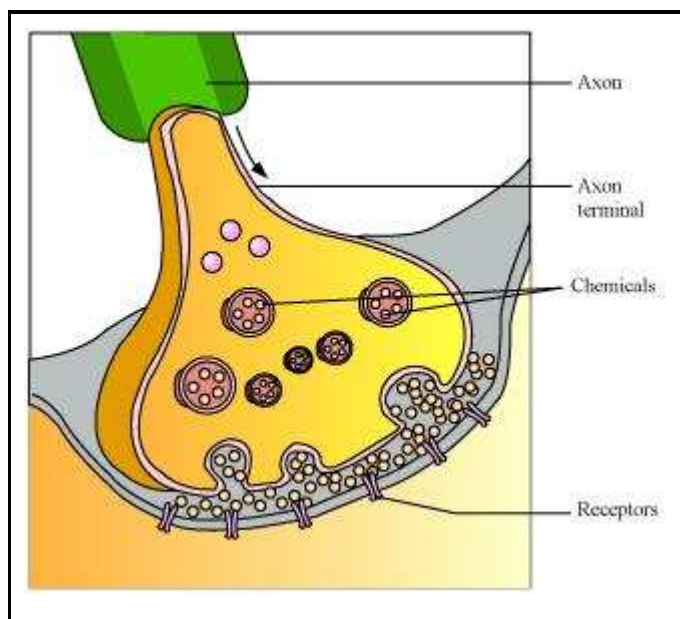
A reflex action is a rapid, automatic response to a stimulus. It does not involve any thinking. For example, we close our eyes immediately when the bright light is focused. Walking, on the other hand, is a voluntary action. It is under our conscious control.

Question 2:

What happens at the synapse between two neurons?

Answer:

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.

**A synapse or neuromuscular junction****Question 3:**

Which part of the brain maintains posture and equilibrium of the body?

Answer:

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

**Question 4:**

How do we detect the smell of an *agarbatti* (incense stick)?

Answer:

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.

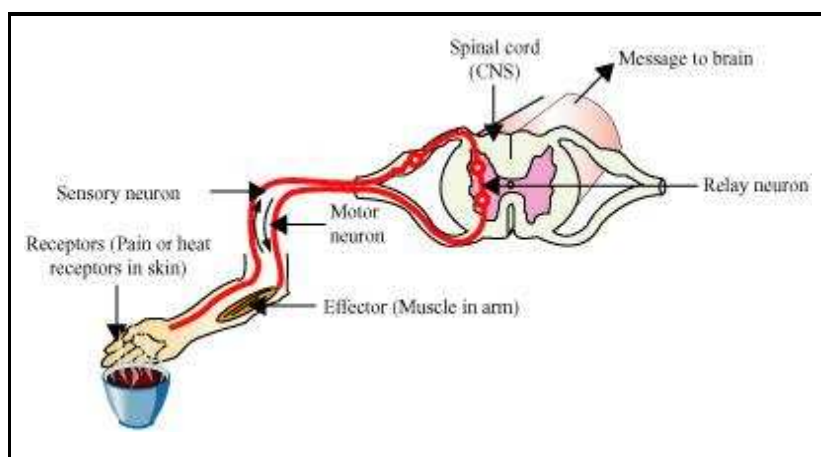
Question 5:

What is the role of the brain in reflex action?

Answer:

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 arc**

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.

**Question 1:**

What are plant hormones?

Answer:

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.

Question 2:

How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

Answer:

The movement of leaves of the sensitive plant, *Mimosa pudica* or “touch me not”, occurs in response to touch or contact stimuli. This movement is independent of growth. The movement of shoot towards light is known as phototropism. This type of movement is directional and is growth dependent.

Question 3:

Give an example of a plant hormone that promotes growth.

Answer:

Auxin is an example of growth-promoting plant hormone.

Question 4:

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

Answer:

Auxin is synthesized at the shoot tip. It helps the cell grow longer. When a tendril comes in contact with a support, auxin stimulates faster growth of the cells on the opposite side, so that the tendril forms a coil around the support. This makes the tendrils appear as a watch spring.

Question 5:

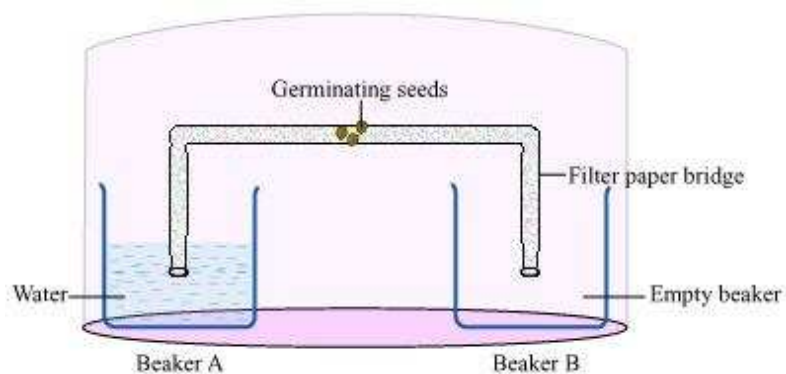
Design an experiment to demonstrate hydrotropism.

Answer:

Take two small beakers and label them as A and B. Fill beaker A with water. Now make a cylindrical-shaped roll from a filter paper and keep it as a bridge between beaker A and beaker B, as shown in the figure. Attach few germinating seeds in the middle of the filter

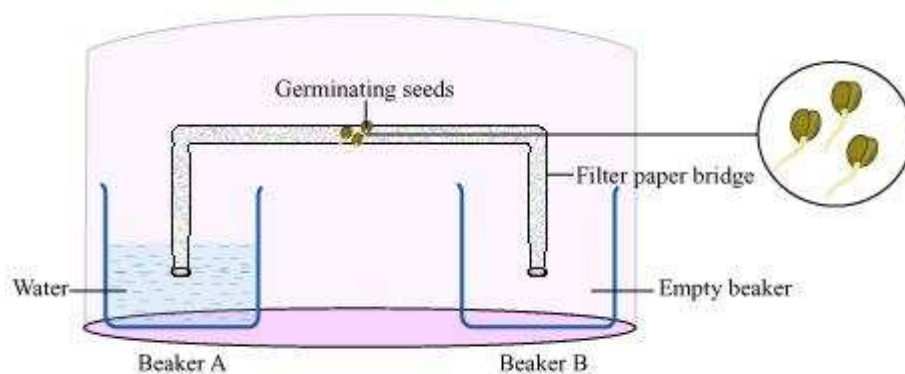


paper bridge. Now, cover the entire set-up with a transparent plastic container so that the moisture is retained.



Observation:

The roots of the germinating seeds will grow towards beaker A.



This experiment demonstrates the phenomenon of hydrotropism.

**Question 1:**

How does chemical coordination take place in animals?

Answer:

Chemical coordination takes place in animals with the help of hormones. Hormone is the chemical messenger that regulates the physiological processes in living organisms. It is secreted by glands. The regulation of physiological processes, and control and coordination by hormones comes under the endocrine system. The nervous system along with the endocrine system in our body controls and coordinates the physiological processes.

Question 2:

Why is the use of iodised salt advisable?

Answer:

Iodine stimulates the thyroid gland to produce thyroxin hormone. It regulates carbohydrate, fat, and protein metabolism in our body. Deficiency of this hormone results in the enlargement of the thyroid gland. This can lead to goitre, a disease characterized by swollen neck. Therefore, iodised salt is advised for normal functioning of the thyroid gland.

Question 3:

How does our body respond when adrenaline is secreted into the blood?

Answer:

Adrenalin is a hormone secreted by the adrenal glands in case of any danger or emergency or any kinds of stress. It is secreted directly into the blood and is transported to different parts of the body.

When secreted in large amounts, it speeds up the heartbeat and hence supplies more oxygen to the muscles. The breathing rate also increases due to contractions of diaphragm and rib muscles. It also increases the blood pressure. All these responses enable the body to deal with any stress or emergency.

Question 4:

Why are some patients of diabetes treated by giving injections of insulin?

Answer:

Diabetes is a disease in which the level of sugar in the blood is too high. Insulin, a hormone secreted by the pancreas, helps in regulating the blood sugar levels. This is the reason why diabetic patients are treated by giving injections of insulin.

**Question 1:**

Which of the following is a plant hormone?

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

Answer:

(d) Cytokinin is a plant hormone.

Question 2:

The gap between two neurons is called a

- (a) dendrite.
- (b) synapse.
- (c) axon.
- (d) impulse.

Answer:

(b) The gap between two neurons is called a synapse.

Question 3:

The brain is responsible for

- (a) thinking.
- (b) regulating the heart beat.
- (c) balancing the body.
- (d) all of the above.

Answer:

(d) The brain is responsible for thinking, regulating the heart beat and balancing the body.

Question 4:

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

Answer:

Receptors are sensory structures (organs/tissues or cells) present all over the body. The receptors are either grouped in case of eye or ear, or scattered in case of skin.

Functions of receptors:

- (i) They sense the external stimuli such as heat or pain.



(ii) They also trigger an impulse in the sensory neuron which sends message to the spinal cord.

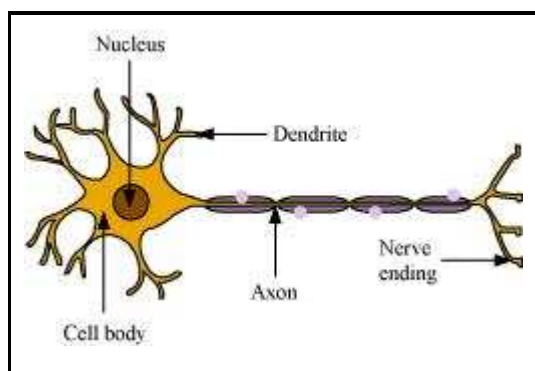
When the receptors are damaged, the external stimuli transferring signals to the brain are not felt. For example, in the case of damaged receptors, if we accidentally touch any hot object, then our hands might get burnt as damaged receptors cannot perceive the external stimuli of heat and pain.

Question 5:

Draw the structure of a neuron and explain its function.

Answer:

Neurons are the functional units of the nervous system. The three main parts of a neuron are axon, dendrite, and cell body.

**Structure of a neuron****Functions of the three parts of a neuron:**

Axon: It conducts messages away from the cell body.

Dendrite: It receives information from axon of another cell and conducts the messages towards the cell body.

Cell body: It contains nucleus, mitochondria, and other organelles. It is mainly concerned with the maintenance and growth.

Question 3:

What are the changes seen in girls at the time of puberty?

Answer:

Secondary sexual characteristics in girls:

- Increase in breast size and darkening of skin of the nipples present at the tips of the breasts.
- Appearance of hair in the genital area.



- Appearance of hair in other areas of skin like underarms, face, hands, and legs.
- Increase in the size of uterus and ovary.
- Beginning of menstrual cycle.
- More secretion of oil from the skin, which results in the appearance of pimples.

Question 7:

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

Answer:

The reflex arc connections between the input and output nerves meet in a bundle in the spinal cord. In fact, nerves from all over the body meet in a bundle in the spinal cord on their way to the brain. In case of any injury to the spinal cord, the signals coming from the nerves as well as the signals coming to the receptors will be disrupted.

Question 8:

How does chemical coordination occur in plants?

Answer:

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.

Question 9:

What is the need for a system of control and coordination in an organism?

Answer:

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.

Question 10:

How are involuntary actions and reflex actions different from each other?

Answer:

Involuntary actions cannot be consciously controlled. For example, we cannot consciously control the movement of food in the alimentary canal. These actions are however directly under the control of the brain. On the other hand, the reflex actions such as closing of eyes immediately when bright light is focused show sudden response and do not involve any thinking. This means that unlike involuntary actions, the reflex actions are not under the control of brain.

Question 11:

Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

Answer:

	Nervous system mechanism		Hormonal system mechanism
1.	The information is conveyed in the form of electric impulse.	1.	The information is conveyed in the form of chemical messengers.
2.	The axons and dendrites transmit the information through a coordinated effort.	2.	The information is transmitted or transported through blood.
3.	The flow of information is rapid and the response is quick.	3.	The information travels slowly and the response is slow.
4.	Its effects are short lived.	4.	It has prolonged effects.

Question 12:

What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?



Answer:

	Movement in sensitive plants		Movement in our legs
1.	The movement that takes place in a sensitive plant such as <i>Mimosa pudica</i> occurs in response to touch (stimulus).	1.	Movement in our legs is an example of voluntary actions.
2.	For this movement, the information is transmitted from cell to cell by electro-chemical signals as plants do not have any specialised tissue for conduction of impulses.	2.	The signal or messages for these actions are passed to the brain and hence are consciously controlled.
3.	For this movement to occur, the plant cells change shape by changing the amount of water in them.	3.	In animal muscle cells, some proteins are found which allow the movement to occur.