Grade X - Science

Lesson 6. Control and Co-ordination

Objective Type Questions

(1 Mark each)

I. Multiple choice questions

1. Which of the following is a plant hormone?

   a. Insulin b. Oestrogen c. Thyroxine **d. Cytokinin**

2. The growth of tendril in pea plants is due to :

   a. effect of light

   b. effect of gravity

   c. rapid cell divisions in tendrillar cells that are away from the support

   d. rapid cell divisions in tendrillar cells in contact with the support

3. The movement of sunflower in accordance with path of sun is due to:

   a. Phototropism b. geotropism

   c. chemotropism d. hydrotropism

4. Which of the following is not associated with the growth of a plant?

   a. Auxin b. Gibberellins

   c. Cytokinins **d. Abscisic acid**

5. The substance that triggers the fall of mature leaves and fruits from plants is due to:

   a. auxin b. gibberellins **c. abscisic acid** d. cytokinin

II. Multiple choice questions

1. Which part of a nerve cell contains a nucleus?

   a. Axon b. Dendrite **c. Cyton** d. Nerve endings

2. Reflex arc in formed by

   a. muscle → brain → receptor

   b. muscle → spinal cord → receptor

   c. receptor → brain → muscles

   d. receptor → spinal cord → muscles

3. Which of the following tissues provide control and coordination in animals?

a. Nervous an skeletal
b. Muscular and skeletal
c. Muscular and Transport
d. **Nervous and Muscular**

4. A student accidentally places her hand on a flam of candle and quickly pulls her hand away. The flame represents.

a. a response
b. a stimulus
c. an impulse
d. an efector

5. How many pairs of cranial nerves are present in man?

a. 12 b. 21 c. 31 d. 41

6. Reflex actions are mediated through

a. brain b. effectors **c. spinal cord** d. receptors

7. The leave of mimosa are sensitive to

a. light b. smell **c. touch** d. heat

8. Which statement is incorrect about auxins?

a. They promote the growth of root
b. They promote the growth of shoot
c. They influence the formation of flower and ripening of fruit
d. They inhibit the growth of root

9. The hormone that is used to keep flowers fresh is

a. crtokinin b. gibbrellins c. auxin d. abscisic acid

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. stimulate cell division

11. Abscisic acid controls

a. cell elongation and cell wall formation
b. shoot elongation
c. cell division
d. leaf fall and dormancy

12. Which endocrine gland is also known as 'master glands'?

a. Pancreas b. Adrenal **c. Pituitary** d. Hypothalamus

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

a. Adrenal b. Pituitary c. Ovaries **d. Pancreas**

14. Which hormone regulates the ionic balance in the body?

a. Glucagon b. Thyroxine c. Testosterone **d. Vasopressin**

15. Which of the following is not a ductless gland?

a. Adrenal **b. Liver** c. Thyroid d. Pituitary

16. Ageing in human beings is caused by disappearance of which of the following glands?

a. Adrenal b. Pituitary c. Thyroid **d. Thymus**

17. Which of the following statements is correct about receptors?

a. Gustatory receptor detect taste while olfactory receptors detect smell

b. Both gustatory and olfactory receptors detect smell

c. Auditory receptors defect smell and olfactory receptors detect taste

d. Olfactory receptors detect taste and gustatory receptors smell

18. Which of the following is not associated with growth of plants?

a. Auxin b. Gibberellins c. Cytokinins **d. Abscisic acid**

19. Involuntary actions in the body are controlled by

a. medulla in forebrain b. medulla in midbrain

c. medulla in hindbrain d. medulla in spinal cord

III. Multiple choice questions

1. In humans, in life processes are controlled and regulated by:
   a. reproductive and endocrine system
   b. respiration and nervous system
   c. endocrine an endocrine system
   d. nervous and endocrine system
2. In a neuron, conversion of electrical signal to chemical signal occurs at/in:
   a. Cell body **b. axonal end**
   c. dendritic end d. axon

3. In a synapse, chemical signal is transmitted from:
    a. dendritic end of one neuron to axonal end of another neuron.
    b. axon to cell body of the same neuron.
    c. cell body to axonal end of the same neuron.
    d. axonal end of the neuron to dendritic end of another neuron.
4. Electrical impulse travels in a neuron from:
    a. Dendrite → axon → axonal end → cell body.
    b. Cell body → dendrite → axon → axonal end.
    c. Dedrite → cell body → axon → axonal end.
    d. Axonal end → axon → cell body → dendrite
5. The brain is responsible for:
    a. Thinking.
    b. regulating the heart beat.
    c. balancing the body.
    d. all of the above.

I Assertion & Reason

Direction : In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

a. Both A and R are true and R is the correct explanation of A
b. Both A and R are true but R is Not the correct explanation of A.
c. A is true but R is false.
d. A is false but R is true.

1. **Assertion (A)** : Nerve impulse is transmitted from dendrite to axon terminals.
   Reason (R) : Nerve impulse is transmitted from dendrite to axon terminals.

Ans. Option (C) is correct.

2. **Assertion (A)** : Our body maintains blood sugar level.
   Reason (R) : Pancreas secretes insulin which helps to regulate blood sugar levels in the body.

Ans. Option (A) is correct.

3. **Assertion (A)** : Failure of secretion of growth hormone from an early age causes dwarfism in the patient.

Reason (R) : Growth hormone stimulates the body growth and elongation of long bones.

Ans. Option (A) is correct.

4. **Assertion (A):** Males have more stature than females during puberty.

Reason (R) : This is because of presence of thyroxin in the blood of females.

Ans. Option n (C) is correct.

II. Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(A) Both A and R are true and R is the correct explanation A.

(B) Both A and R are true R is Not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

1. **Assertion (A)** : Auxins are synthesised in the growing tips of the plant.

Reason (R) : Auxin concentration is highest at the tip of the root.

Ans. Option (C) is correct.

2. **Assertion (A)** : Phototropism is caused by auxin.

Reason (R) : When light hits on one side of the plant, auxin diffuses towards the shady side of the shoot.

Ans. Option (A) is correct.

3. **Assertion (A)** : Abscisic acid is a stress hormone.

Reason (R) : Stimulation of ABA occurs in adverse conditions.

Ans. Option (A) is correct.

4. **Assertion (A)** : Gibberellins induce intermodal growth in dwarf plant varieties.

Reason (R) : Gibberellins when applied to normal plants, increases the length of the plant.

Ans. Option (C) is correct.

II. Assertion & Reason

Directions: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

(A) Both A and R are true and R is the correct explanation A.

(B) Both A and R are true R is Not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

1. **Assertion** : Reflex Arc works faster than thinking process of brain.

   Reason : Reflex Arc Works in case of those animals who do not have thinking process

Ans. Option (C) is correct.

2. **Assertion** : Impulse travels from dendrite to cell body and then along the axon to its end.

   Reason : Information acquired at the end of the dendrite tip of a nerve cell sets of an electric impulse.

Ans. Option (A) is correct.

3. **Assertion** : Brain is a delicate organ which is protected from injury.

   Reason : The body box protects the brain from any shock.

Ans. Option (C) is correct.

4. **Assertion** : Plants do have an nervous system for control and coordination.

   Reason : Plants use electro chemical means for convey information from cell to cell.

Ans. Option (D) is correct.

5. **Assertion** : On attaining of the Assertion is false but the Reason is true.

   Reason : Ovaries release hormone progesterone in female.

Ans. Option (b) is correct.

Fill in the blanks

1. The cells in our that can be over a foot long are _____.

   Ans. Nerve cells.

2. The box enclosing the brain is called the _____.

   Ans. cranium

3. The lobes – parietal the brain is called the _____.

   Ans. Cerebrum.

4. In a neuron, conversion of electrical signal to chemical signal occurs at/in _____.

   Ans. Axonal end.

5. Posture and balance of the body is controlled by _____.

   Ans. Cerebellum.

6. The movement of shoot towards light is _____.

Ans. Phototropism.

7. The movement of shoot towards light is _____.

Ans. Phototropism.

True or False

1. Reflex action is an autonomic motor response without the involvement of brain.

Ans. True.

2. Insulin is given to the person suffering from goitre.

Ans. False.

3. Iodine is essential for the synthesis of thyroxin.

Ans. True.

4. Plants coordinate their behaviour against environment changes by using plant hormones.

Ans. True.

5. The reaction to stimuli is a characteristic property of animals only.

Ans. False.

6. The shoots of potted plant kept near the window bend towards sunlight because of negative phototropism.

Ans. False.

7. A cell or group of cells in a sense Organ which is sensitive to a particular type of stimulus is called receptor.

Ans. True.

8. The hormone which is associated with female puberty is called testosterone.

Ans. False.

9. The job of the central nervous system is to collect all the information from all the receptors in our body

Ans. True.

1. **Match the column I and Column II**

Column I	Column II
(i) Neuron	(A) short and branched
(ii) Cyton	(B) Elongated fibre
(iii) Dendrite	(c) Functional unit of nervous system
(iv) Axon	(D) Contains nucleus and cytoplasm

Ans. (i) (C), (ii) (D), (iii) (A), (iv) (B)

2.

Column I	Column II
(i) Photoreceptor	(A) Smell
(ii) Gustatoreceptor	(B) Sound
(iii) Olfactoreceptor	(C) Taste
(iv) Phonoreceptor	(D) Light

Ans. (i) (D), (ii) (C), (iii) (A), (iv) (B)

Very Short Answer Type

Subjective Type Questions

(1 mark each)

1. What meant by tropic movement?

Ans. Plant growth movements in response to stimuli from a particular direction are called tropic movements. The direction of movement is always related to the direction of stimulus.

2. State the main functions of abscisic acid in plants.

Ans. Abscisic acid inhibits the growth of plants.

3. Name two tissues that provide control and coordination in multicellular animals.

Ans. The two tissues that provide control and coordination in multicellular animals are nervous and endcrinal tissues.

4. Why do liing organisms show movement?

Ans. To use changes in the environment to their advantage.

5. Mention the part of the body where gustatory and olfactory receptors are located.

Ans. Gustatory receptors are located in cerebrum of fore brain. Olfactory receptors are located in Olfactory lobe of fore-brain.

6. State the function of :

(a) gustatory receptors, and

(b) olfactory receptors.

Ans. (a) Gustatory receptors receive taste.

(b) Olfactory receptors receive smell.

7. If we step on something sharp accidently, we move our foot away at once. What type of response is it?

Ans. Reflex action.

8. What is the significance of reflex action?

Ans. Reflex action enables the animals to respond quickly and relieves the brain from excess work.

9. Name the two components of central nervous system in humans.

Ans. The two components of Central Nervous System in human are brain and spinal cord.

10. How is the spinal cord protected in the human body?

Ans. Spinal cord is enclosed in a bony cage called vertebral column.

11. Mention the function of the hind- brain in humans.

Ans. Hind-brain coordinates the body movements and posture. It also controls respiration.

12. Which part of the brain is concerned with memory, will and power?

Ans. Cerebral hemisphere.

13. Name the place of the human body where largest number of neurons are found.

Ans. Human brain.

14. Name the part of the brain which is concerned with muscular coordination in the body.

Ans. Cerebellum.

15. Which is the main coordinating centre of the body?

Ans. Brain.

16. What are the different parts of the human brain?

Ans. Three major parts namely fore-brain, mid –brain and hind-brain.

17. Mention the components of fore-brain.

Ans. Cerebrum and olfactory lobes.

18. Do you know which part of the brain you use to think?

Ans. Fore-brain.

19. Which part controls the involuntary actions such Medulla of hind-brain.

Ans. Medulla of hind-brain.

20. Which part our brain is responsible for maintaining posture and balance of our body?

Ans. Cerebellum.

21. What are tropic movements?

Ans. The movement which is plant makes in response to an external stimulus is called tropic.

22. What are nastic movements?

Ans. There are certain movements due to stimulus of certain movements due to stimulus of contact, light, heat, etc. Such movement are called nastic movements.

23. What are the different stimuli acting on plants?

Ans. Light, gravity, water and touch.

24. How do plants convey information?

Ans. By chemical coordination.

25. A young green plant receives sunlight from one direction only, what will happen to its shoots and roots?

Ans. Shoots will bend towards the light and roots away from the light.

26. A potted plant is made to lie horizontally on the ground. Which part of the plant will show

(a) Positive geotropism?

(b) negative geotropism?

Ans. (a) Root (b) Shoot.

27. Why hormones are called as 'chemical messengers'?

Ans. Hormones are carried in the blood streams to all parts of the body, so they are called ' chemical messengers'.

28. Which gland is known as master gland?

Ans. Pituitary gland.

29. Why is pituitary called the master gland?

Ans. The pituitary gland controls the activity of their endocrine glands; so it is called the master gland.

30. What are the functions of the Hypothalamus?

Ans. Hypothalamus regulates the secretion of hormones from pituitary gland.

31. What are endocrine glands?

Ans. Ductless glands which manufacture hormones and secrete them directly into the blood stream.

32. Why are endocrine glands called ductless glands?

Ans. Endocrine glands are called ductless glands because they do not have any external duct to discharge their secretions into the blood stream.

33. Where hypothalamus gland is located?

Ans. Hypothalamus gland is located in the brain.

34. Name the hormone which is associated with the metabolism of carbohydrates, protein, calcium and phosphorus.

Ans. Thyroxine.

35. Name the part of human body in which secretes digestive enzymes as well as hormones.

Ans. Pancreas.

36. Name the glands which secrete estrogen and progeteones.

Ans. Pancreas.

37. Name the glands which secrete estrogen and progestrerone.

Ans. Ovaries.

38. Name the hormone that regulates blood sugar level.

Ans. Insulin.

39. Name the plant hormones which help/promote

(a) Cell division **(b) growth of the stem.**

Ans. The plant hormones which help of promote:

(a) Cell division ___ Cytokinins

(b) Growth of the stem ____ Gibberellins.

40. Name one plant growth hormone which retards growth during extremely dry season.

Ans. Abscisic acid.

41. Name one plant growth hormone is synthesized in case of plants and man.

Ans. Shoot tip in plants and pituitary gland (anterior) in man.

42. What will happen to a plant shoot if sunlight falls on it from one direction only?

Ans. Plant hormone.

43. Where is auxin synthesized in plants?

Ans. Auxin synthesized in stem.

44. Name the two components of peripheral nervous systems.

Ans. Cranial nerves arising from the brain and the spinal nerves arising from the spinal cord.

45. Mention the part of the brain which controls the involuntary actions like blood pressure, salivation etc.

Ans. Medulla in the hindbrain.

46. Name the hormones in human which regulates carbohydrates, protein and fat metabolism in the body. Mention the site where it is synthesised.

Ans. The hormone is thyroxin.

The site where it is synthesised is thyroid gland.

47. Define feedback mechanism of hormones.

Ans. The mechanism that controls the flow of hormones is called feedback mechanism of hormones.

48. Name two components of central nervous system in humans.

Ans. Brain and spinal cord.

6. Name the part of the brain which controls posture and balance of the body.

Ans. Cerebellum.

49. Mention the part of the body where gustatory and olfactory receptors are located.

Ans. Tongue and Nose.

Short Answer Type Questions – I

1. How does auxin promote phototropism? (2 mark each)

Ans. Auxin, a plant hormone synthesised at the shoot tips, helps the cells to grow longer. When light comes from one side of the plant, 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 while growing . This phenomenon is called phototropism.

Detailed Answer :

Auxin is the hormone which is usually synthesised in the young tip of roots and shoots. When light comes from one side of the plants, if diffuses away from light towards the shady side of the shoot which stimulates the cells to grow longer, resulting in the bending of shoot towards light, thus auxin promotes phototropism.

2. Write one example each of the following tropic movements:

Ans. (a) Positive phototropism : Shoots growing towards light.

(b) Positive geotropism : Growth of roots towards earth due to the gravitational pull of the earth.

(c) Hydrotropism : Roots growing towards the source of water.

(d) Chemotropism : Growth of pollen tubes towards the ovules.

3. (a) Which plant hormone is present in greater concentration in the areas of rapid cell division?

(b) Give one example of a plant growth promoter and plant growth inhibitor.

Ans. (a) Cytokinin.

(b) Plant Growth promoter: Auxin/Gibberellin.

Plant Growth Inhibitor : Abscisic acid(ABA)

4. Different parts of brain are associated with specific functions. Name the part of human brain which performs the following functions:

a. Sensation of feeling full

b. Vomiting

c. Picking up a pencil

d. Riding bicycle

Ans. a. Forebrain

b. Medulla/Hind Brain

c. Cerebellum/Hind Brain

d. Cerebellum/Hind Brain

5. Name the parts of the brain that perform the following functions:

(i) Maintaining the posture and balance of the body.

(ii) Regulating blood pressure.

(iii) Sensation of hunger or feeling full.

(iv) Seeing

Ans. (i) cerebellum

(ii) Hind brain

(iii) Fore brain

(i) Fore brain

6. How does our body maintain blood sugar level?

Ans. Pancreas secretes insulin which helps to regulate blood sugar levels in the body . If sugar level in blood rises, insulin stimulates the target cells to take up the extra glucose from the blood

Short Answer Type Questions - II **(3 marks each)**

1. (a) What is tropism?

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

Ans. (a) Tropism: It is the directional movement of a plant organ in response to an extreme stimulus.

(b) Auxins produced in the shoot tip move downloads in the plant. These auxins cause cell elongation in the growing tissues. In the tendrils, auxins move away from the point of contact with the supporting object while more growth occurs o the side away from the support as a result of unequal growth on the support as a result of unequal growth on the two sides, the tendril coils around the support.

Detailed Answer:

(a) Directional movements of the plant part towards or away from the stimulus.

(b) When the tip of the tendril comes in contact with support, more auxin is diffused from the tip towards the side of the tendril away from the support. As a result, that side grows faster and causes the tendril to bend around the support.

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

(a) Growth of stem

(b) Promotion of cell division

(c) Inhibition of growth

(d) Elongation of cells

Ans. Plant hormones: Chemical substances which help the plant to coordinate growth and development.

(a) Auxins / Gibberellins

(b) Cytokinin

(c) Abscisic Acid / ABA

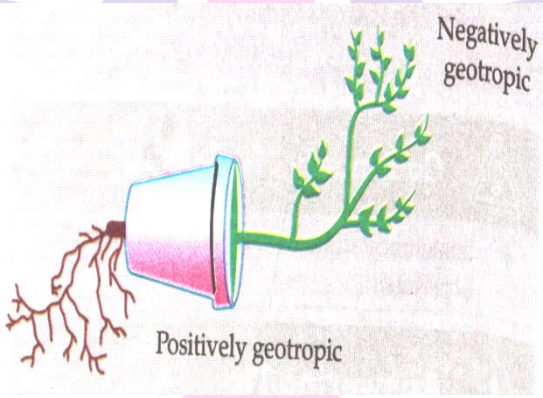
(d) Auxins / Gibberellins

3. **What is geotropism ? Draw a labelled diagram of a potted plant showing positive geotropism and negative geotropism.**

OR

Define positive geotropism and negative geotropism. Give one example of each.

Ans. The upward growth of shoots and downward growth of roots in response to the pull of earth's gravity is called geotropism.



Detailed Answer:

The movement of plant part in response to gravity is called geotropic movement and the phenomenon involved is called geotropism.

When the tip of the stem grows away from the earth's gravitational force, it is known as negative geotropism and when the root tips grow towards gravity, it is known as positive geotropism.

In the above figure, stem shows negative geotropism while roots show positive geotropism.

4. **(a) (i) Name one gustatory receptor and one olfactory receptor present in human beings.**

(ii) Write a and b in the given flow chart of neuron through which information travels as an electrical impulse.

(b) What do you understand by term 'target organ'? Give any one example.

Ans. (a) (i) gustatory receptor __ Tongue.

Olfactory receptor ___ Nose

- Cell body/Cyton

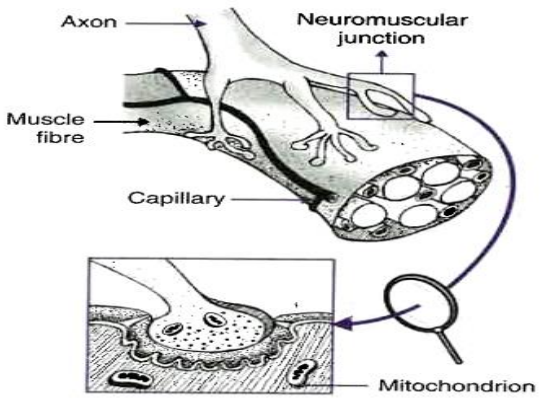
(ii)
- Axon

5. (a) Which is the control centre of a reflex action? What is the route taken by the reflex action called ?

(b) What is Neuromuscular junction?

Ans. (a) Spinal cord is the control centre of a reflex action. The route taken by the reflex action is called reflex arc.

(b) It is point where a muscle. Fibre comes in contact with a motor neuron carrying nerve impulses from the central nervous system. The impulses travel from the neuron to the muscle fibre by means of a neurotransmitter in the same way as the transmission of impulses across a synapse between two neurons.



Neuromuscular junction

6. (a) What are cranial nerves? How many cranial nerves does a human being have?

(b) Write the difference between cerebellum and cerebrum.

Ans. (a) Cranial nerves arise from the brain and spread throughout the head.

There are twelve pairs of cranial nerves.

(b)

Cerebrum	Cerebellum
(i) It is the largest highly developed and prominent part of the brain.	(i) It is the second largest part of the brain and lies at the posterior part of the brain.
(ii) It is the controlling centre for senses. It is responsible for memory, intelligence, hearing etc	(ii) It controls the skeletal, muscle activities and maintains the equilibrium of the body.

7. (a) Which is the largest part of the brain? What are its functions?

(b) Cerebrum between spinal nerve and cranial nerve.

Ans. (a) Cerebrum is the largest part of the brain. Its various regions carry out different activities, i.e. occipital lobe for vision, temporal for auditory resection, parietal for touch, smell, temperature and consciousness and frontal lobe for muscular activities.

(b)

Spinal nerve	Cranial nerve
(i) They arise from spinal cord. (ii) There are 31 pairs of spinal nerves	(i) They arise from brain. (ii) There are 12 pairs of cranial

8. (a) How do you support the statement that 'pancreas' are the overall controller of the blood glucose level?

(b) What are 'releasing hormones'? Where are they released from?

Ans. (a) Pancreas release insulin which lowers the blood glucose. Moreover, it also releases glucagon which increases blood glucose. Therefore, pancreas is the overall controller of blood glucose level.

(b) 'Releasing hormones' are chemical substances which regulate the secretion of hormones from pituitary gland.

They are released from hypothalamus gland.

9.(a) Justify that the pancreas and the gonads perform dual functions.

(b) Explain with an example the role played by hypothalamus in human body.

Ans. (a) Pancreas secretes digestive enzymes as well as insulin and glucagon hormones, Similarly, Gonad produce gametes as well as male and female sex hormones. Thus, pancreas and gonads perform 'dual functions'.

(b) Hypothalamus plays important role in producing releasing hormones and inhibiting hormone. For example, if the level of growth hormone decreases in body, the hypothalamus releases neurohormones which stimulates the pituitary gland to release growth hormone.

10. Distinguish between exocrine and endocrine glands.

Ans.

Exocrine glands	Endocrine glands
(i) They may or may not have ducts. (ii)They secrete enzymes (ii) They either function in site and pour their secretions directly near its target or through a duct.	(i) They are ductless glands. (ii) They secrete hormones. (iii) They pour their secretions directly into blood

11. (a) Where are pons present in the brains? Which activity do they control?

(b) Different parts of brain are associated with specific functions. Name the part of human brain which perform the following functions:

Ans. (a) Pons are situated below the cerebellum and above the medulla oblongata in the hind-brain. They are responsible for regulating the respiratory activity.

(b) (i) Hindbrain (cerebellum)

(ii) Hindbrain (cerebellum)

12. Suggest a proof that even unicellular organisms like Amoeba respond to stimuli. Justify giving two examples that even plants respond to stimuli.

Ans. Amoeba moves towards food and tends to aggregate in moderate warm water. Amoeba and other protozoa avoid mechanical obstacles. Thus, unicellular organisms responds to stimuli. Roots of plants move downwards in response to gravitational force and shoots of plants move towards light. This shows that plants respond to stimuli.

13. (a) What are sensory and motor neurons? Write their function.

(b) Different parts of brain are associated with specific functions. Name the part of human rain which perform the following functions:

(i) Sensation of feeling full

(ii) Vomiting

Ans. (a) Two types of neurons are:

(i) Sensory neurons – They transmit information from the receptors to the central nervous system.

(ii) Motor neurons – They transmit information from the brain to the effectors organs.

(b) (i) Forebrain (a centre for hunger)

(ii) Hindbrain (medulla)

14. State the functions of any three of the structural and functional unit of nervous system.

Ans. The structural and functions unit of nervous system i.e. neuron with their functions are as follows:

(i) Cell body: Stimulus received from dendrite is changed into impulse in the cyton.

(ii) Dendrities : They receive sensation or stimulus, which may be physical, chemical, mechanical or electrical. They pass the stimulus to cyton.

(iii) Axon : It conducts impulse away from the cell body.

15. What is a reflex action ? Describe the steps involved in a reflex action.

Ans. Reflex Action. It is defined as an unconscious, automatic and involuntary response of effectors, i.e muscles and glands, to a stimulus, which is monitored through the spinal cord.

Mechanism of Reflex Action : It is involves the following steps:

(i) Receptor organ like skin perceives the stimulus and activates a sensory nerve impulse.

(ii) Sensory organ carries message in the form of sensory impulse to the spinal cord.

(iii) The spinal cord acts as modular. The neurons of spinal cord transmit the sensory nerve impulse to motor neuron.

(iv) Motor nerve conducts these impulses to the effectors like leg muscles which responds by pulling back the organ away from the harmful stimulus.

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

Ans. 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 dendrite tips of a neuron sets of 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 so, chemicals, which cross the synapse and start a similar electrical impulse in a dendrite of the next neuron. I his was nerve impulse travels in the bod.

Synapse helps in transmitting impulses from one neuron to another.

17. (a) How is brain protected from injury and shock?

(b) Name two main parts of hind brain and state the function of each.

Ans. (a) The brain sit inside a bony box. Inside the box, the brain is constrained in a fluid filled balloon which provides further shock absorption.

(b) Two main parts of hind brain are Medulla and Cerebellum. Their functions are:

Medulla: It controls involuntary actions such as blood pressure, salivation and vomiting are controlled by medulla.

Cerebellum: It is responsible for precision of voluntary actions and maintaining the posture and balance of the body.

18. Write any three functions of the Nervous System

Ans. (i) It regulates involuntary actions.

(ii) It controls and coordinate voluntary muscular activities.

(iii) It keeps us informed about the outside world through the sense organs.

(iv) It enables us to think, reason and remember.

(v) It controls all the reflex actions in our body thus protecting it from harm.

19. Draw neat diagram of human brain and label on it the following parts:

(i) Midbrain

(ii) Pituitary gland

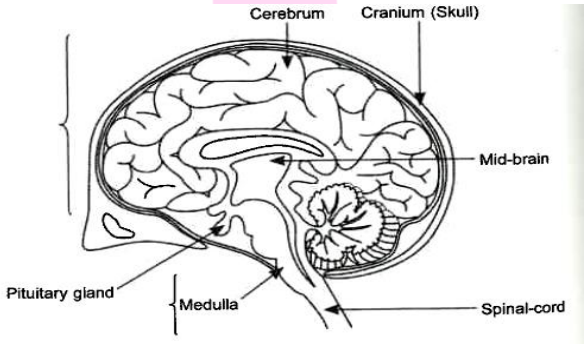
(iii) Medulla

(iv) Cerebrum

(v) Cranium

(vi) Spinal cord

Ans.



20. Write one example each of the following tropic movements:

(a) Positive phototropism

(b) Negative phototropism

(c) Positive geotropism.

(d) Negative geotropism.

(e) Hydrotropism

(f) Chemotropism

Ans. (a) Positive phototropism : Movement of stem of a plant towards light.

(b) Negative phototropism : Movement of roots away from light.

(c) Positive geotropism : Movement of roots towards gravity.

(d) Negative geotropism: Upwards movement of shoots.

(e) Hydrotropism : Growth of root of a plant towards water in soil.

(f) Chemotropism : Growth of pollen tubes towards ovule.

21. State the functions of plant hormones. Name four different types of plant hormones.

Ans. The plant hormones regulate many functions in plants, which are as follows:

(i) Germination of seeds of breaking the dormancy of seeds.

(ii) Growth of root, stem and leaves,

(iii) Flowering of plants,

(iv) Movement of stomata in leaves, and

(v) Phototropism, geotropism, chemtropism and nastic movements.

Four different types of plant hormones are auxins, gibberellins, cytokinins and abscisic acid.

22. Name the hormone which regulates carbohydrate protein and fat metabolism in our body. Which gland secretes this hormone? Why is it important for us to have iodised salt in our diet?

Ans. Thyroxin regulate carbohydrate, protein and fat metabolism in our body.

Thyroxine is secreted from thyroid gland. Deficiency of iodine in our food causes (goitre) Where the thyroid gland to enlarges as it needs to absorbs more amount of iodine. Iodine is required to make thyroxine. Therefore, iodine is added to salt to supplement iodine requirement.

(b) (i) Dendrite (ii) Axon

23. 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?

Ans. The adrenaline hormone is secreted into the blood.

The heart beats faster resulting in supply of more oxygen to the muscles.

Blood is diverted to skeletal muscles.

The breathing rate increases.

The blood supply to digestive systems and skin is reduced.

24. Why is chemical communication better than electrical impulses as a means of communication between cells in a multi- cellular organism?

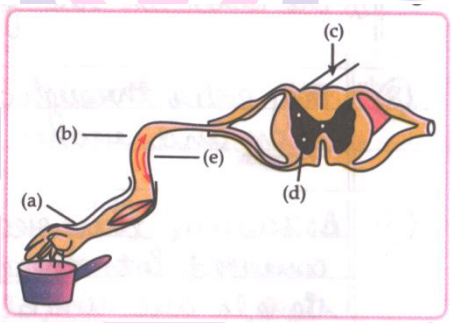
Ans. Electrical impulses have limited access to only those cells that are connected by nervous tissues/neurons, whereas chemical signals can reach each and every cell of the body.

Cell need time to reset in order to create repeated/ new electrical impulses whereas no such time is required for chemical communication.

Detailed Answer:

Chemical communication is better than electrical impulses because chemical communication is mediated through hormones which can diffuse to different regions of the body, thereby allowing cells to communicate even without interacting with each other. Moreover, this type of communication can be maintained at a steady rate and is easy to regulate.

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



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

Ans. (a) – receptor/skin

(b) – sensory neuron

(c) - spinal chord

(d) – relay neuron

(e) – motor neuron

The term given to the sequence of event occurring in diagram is reflex arc.

26. Why does the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron take place but not in the reverse direction? Explain.

Ans. The flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron takes place by the means of specialised chemicals called neurotransmitters. When an electrical signal reaches the axonal end of a neuron, it releases a chemical substance . This chemical diffuses towards the dendrite end of next neuron where it generates an electrical impulse or signal . Hence, the electrical signal is converted into a chemical signal at the axonal

end. Hence , the flow of signals in a synapse happens from axonal end of one neuron to dendritic end of another neuron but not in the reverse direction.

27. Trace the sequence of events which occur when a bright light is focused on your eyes.

Ans. Receptor cells of eyes/ retina → Sensory neuron → Brain / CNs → Motor neuron Eye muscles →Pupil contracts / Eye lids close / blink.

Detailed Answer:

When bright light is focused on our eyes, the photoreceptors generate electric impulses and pass it to the sensory neurons, They carry the stimuli to the spinal cord which transports the message to brain. The brain sends the response to the muscles of the eyelids to close by contracting the pupil. Receptor → Sensory neuron → Spinal cord →Brain → Motor neuron → Eye → Contraction of eye muscles

28.What is feedback mechanism of harmonic regulation. Take the example of insulin to explain this phenomenon.

Ans. Feedback mechanism: Mechanism by which the amount of any chemical increase or decrease resulting in secretion of the related hormone.

Example: When sugar level rises, insulin secretion increases.

When sugar level falls, insulin secretion reduces.

Detailed answer:

Feedback mechanism of harmonic regulation is the mechanism to control the timing and amount of hormone released so that they are secreted in precise quantities. If the sugar levels in blood rise, 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.

29. Nervous and hormonal system together performs the function of control and coordination in human beings. Justify this statement with the help of an example.

Ans. For nervous and hormonal systems to control and coordinate in human beings, hypothalamus plays an important role in receiving the neural/nerve signals from brain and release hormones.

e.g., In iodine deficiency, hypothalamus releases hormones to stimulate pituitary gland, it further sends stimulating hormone to thyroid gland to secrete thyroxine that regulates carbohydrate metabolism.

Detailed Answer:

In human beings, nervous and hormonal system work together in controlling and coordinating various life processes in the body . Nervous system work by generation and transmission of

electrical impulse while hormonal system works by secretion of chemical messengers called hormones. For e.g., When an emergency stimulus is received and analyzed by CNS that sends message to effectors to provide proper response. At the same time, nervous system activates adrenal gland to release adrenaline that prepares body by increasing heat rate, blood pressure, respiration etc. Thus, both these systems work together to perform functions of control and coordination.

30. Pertaining to endocrine system, what will you interprets if:

(i) You observe swollen neck in people living in the hills.

(ii) Over secretion of growth Hormone takes place during childhood.

(iii) Facial hair develops in boys aged 13.

Ans. (i) Less intake of Iodine (in the diet)

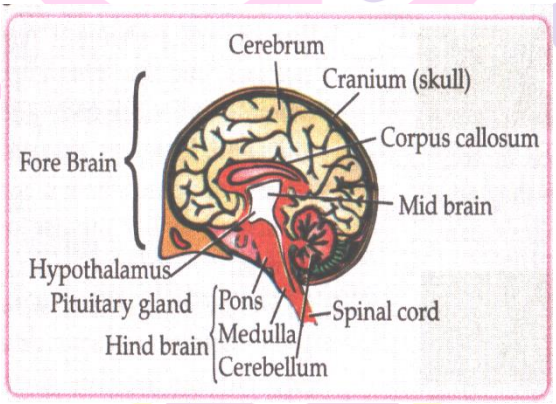
(ii) Will lead to gigantism

(iii) Timely secretion of testosterone.

31. Draw a neat diagram of human brain and label on it the following parts:

(i) Mid brain (ii) Pituitary gland (iii) Cerebellum (iv) Cerebrum

Ans. (i) Labelled diagram of human brain:



32. (a) An old man is advised by his doctor to take less sugar in his diet. Name the disease from which the man is suffering. Mention the hormone due to imbalance of which he is suffering from this disease. Which endocrine gland secretes this hormone?

(b) 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.

Ans. (a) The man is suffering from diabetes mellitus Hormone is Insulin. Endocrine gland that secretes insulin is pancreas.

(b) The endocrine gland which secretes growth hormone is pituitary gland.

(i) Deficiency of growth hormone causes dwarfism.

(ii) Excess secretion of growth hormone causes gigantism.

33. Name the hormone which regulates carbohydrate protein and fat metabolism in our body. Which gland secretes this hormone? Why is it important for us to have iodised salt in our diet?

Ans. (i) The hormone which regulates carbohydrates, protein and fat metabolism in our body is thyroxine.

(ii) Thyroxine hormone is secreted by thyroid gland.

(iv) Iodised salt in diet is important because it contains iodine , which is essential for the synthesis of thyroxine hormone by the thyroid gland. In case, iodine is deficient in our diet, there would be less production of thyroxine hormone and thus there is a possibility of suffering from goitre.

34. (a) Explain any three directional movements in plants.

(b) How brain and spinal cord are protected in human?

(c) Name the master gland present in the brain.

Ans. (a) Three directional movements in plants are:

(i) Phototropism: It is the movement of a part of a plant towards light. e.g. movement of stem towards light.

(ii) Geotropism: The upward and download growth of shoot and roots in response to gravity is called geotropism.

(iii) Chemotropism : It is movement of a part of a plant in response to a chemical stimuli, e.g. growth of pollen tube towards a chemical produced by ovule.

(b) The brain and spinal cord are protected by skeleton –brain by cranium and spinal cord by vertebral column

(c) The master gland present in brain is called pituitary gland.

35. What is feedback mechanism of harmonic regulation. Take the example of insulin to explain this phenomenon.

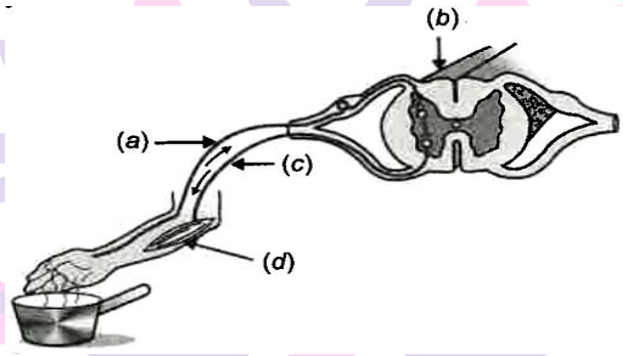
Ans. Hormones are secreted in extremely less quantity. Excess or deficiency of such hormones can have harmful effects on our body. A feedback mechanism controls the timing and secretion of hormones released by various glands.

For example: On the rise of blood glucose level, information is sent to pancreas to release insulin. When the appropriate amount of glucose level is obtained in the blood, the release of insulin is stopped.

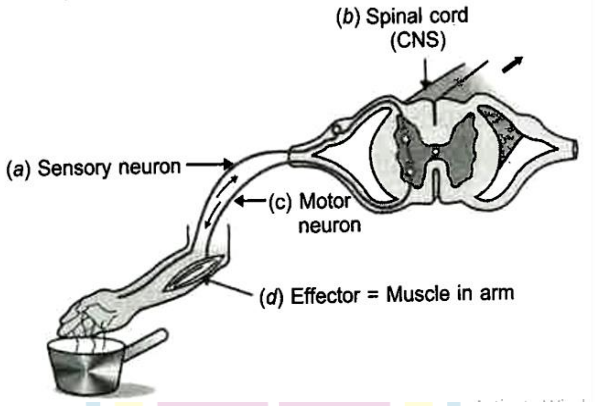
36. Why is it advised to use iodised salt in our diet?

Ans. Iodised salt contains iodine which is necessary for the thyroid gland to synthesise thyroxine hormone. Thyroxine regulates carbohydrate, protein and fat metabolism in the boy to provide growth balance. It deficiency causes goitre.

37. Labels the parts (a), (b), (c) and (d) and show the direction on flow of electrical signals in the given figure.



Ans.



(a) Sensory neuron. (b) Spinal cord (CNS)

(c) Motor neuron. (d) Effectors (Muscle in arm).

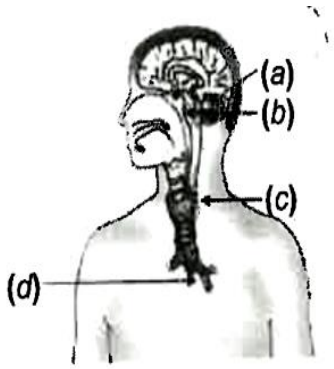
The direction of flow of electrical signals will be

(i) Receptor (hand) to spinal cord through sensory neuron.

(ii) Sensory neuron to motor neuron through replay neuron.

(iii) Spinal cord it effectors through motor neuron.

38. Label the endocrine glands in the given figure.



(a) Pineal gland (b) Pituitary gland
(c) Thyroid gland (d) Thymus gland

Ans. (a) Pineal gland (b) Pituitary gland
(c) Thyroid gland (c) Thymus gland

39. Answer the following:

(a) Name the endocrine gland associated with brain.

(b) Which gland secretes digestive enzymes as well as hormones?

(c)Name the endocrine gland associated with kidneys.

(d) Which endocrine gland is present in males but not in females?

Ans. (a) Pituitary gland (b) Pancreas
(c) Adrenal glands (d) Testes

40. (a) What are receptors?

(b) Define stimulus?

Ans. (a) It is a cells or group of cells specialised to detect a particular stimulus and to initiate the transmission of impulse via the sensory nerves.

(c) It is the change in the external or internal environment of an organism that provokes a physiological and behavioural response in the organisms

Long Answer type questions

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

Ans. The movement/ response of part of plant (root) towards water.

Experiment:

(i) Soak the seeds in water overnight.

(ii) Place moist cotton in a perforated petri dish.

(iii) Put the soaked seeds in the petri dish & place it on a beaker.

(iv)Roots pass through pores and grow downwards.

(v) After sometimes roots will bend towards base of petri dish having moisture.

2. (a) Write the names and one function of each of any three growth hormones in plants.

(b) In the absence of muscle cells, how do plant cells show movement?

Ans. (a) Three growth hormones in plants are:

(ii) Auxin: It is synthesised in the young tip of roots and shoots. It promotes elongation and division of cell and root formation.

(iii) Gibberellines: They help in the growth of the stem.

(iv) Cytokinins: They promote cell division and delay leaf ageing.

(c) Plant cells show two types of movements.

(i) Tropic movements are growth movements in response to an environmental stimulus. This type of movement may occur in response to gravity(geotropism), light (Phototropism), Water(hydrotropism), chemical(chemotropism),etc

(ii) Nastic movement are independent of the direction of stimulus . This type of movement may occur in response to chemicals temperature, touch, etc.

This shows that a plant cell can show movements in response to different stimuli although they do not have muscle cells.

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

(b) How do nerve impulse travel in the body?

Ans. (a) Iodine is essential for functioning of thyroid formation of thyroxine hormone.

Disease is Goitre

Swollen neck

(b) Impulse travels from dendrite to cell body, then along the axon to its end. At the end , some chemicals are released which fill the gap of synapse, and starts a similar electrical impulse to another neuron and the impulse further travel in the body.

Detailed Answer:

(a)Iodine is necessary for thyroid gland to secrete thyroxine hormone which regulates carbohydrate, protein and fat metabolism in the body . Its deficiency may cause goitre. Therefore, use of iodised salt is advisable . Its key symptom is a swollen neck.

(b) The information received at the end of the dendritic tip, sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body and then along the axon to its end. Here, the electrical impulse sets off the release of some chemical which cross synapse inducing a similar impulse in a dendrite of the next neuron.

4. (a) Define receptor and state their location in our body. Mention any two body. Mention any two receptors present in our forebrain and their functions.

(b) How do nerve impulses travel in our body?

Ans.(a) Receptor specialised tips of some nerve cells, which receive information from the surroundings.

Location: Sense organs

Gustatory receptor – detect taste

Olfactory receptor – detect smell

(b) The information acquired at the end of the dendritic tip of a nerve cell, sets off a chemical reaction that creates an electrical impulse, which travels to the cell body, then along the axon to its end where it releases some chemicals across the synapses.

5. Define reflex arc. Draw a flowchart showing the sequence of event which occur during sneezing.

Ans. The pathway taken by nerve impulses in a reflex action is called the reflex arc.
Sequence of event, which occur during sneezing are:

Nerve ending located in the nasal passages

identifies the irritant entered in the nose.

↓

Receptors send the information or nerve impulses

to the sneezing centre located in the brain stem.

↓

Brain stem in return sends the instructions to the

lungs or diaphragm for response

↓

Diaphragm moves abruptly, chest muscles contract

in response to the instructions received.

↓

Air blows out from nose and mouth instantly and rapidly

Sneezing occurs in response to the irritant

↓

Sneezing occurs in response to the irritant

6. (a) How does control and coordination and spinal cord.

(b) Distinguish between cerebrum and spinal cord.

(c) Give technical terms for following events:

(i) The movement of plant parts in response to water.

(ii) The movement of plant parts in response to water.

(iii)The movement of plant parts towards chemical substance.

(iv) The download movement of roots in response to gravitational force.

Ans. (a) In Plants, control and coordination is brought about by means of chemical substance called phytohormones. In addition, environmental factors like water, temperature and light, control growth development.

(b)

Cerebrum	Spinal cord
(i) It contains cell bodies of neurons outside and axons of the neurons inside. (ii) It is the region for memory for memory speech. Reasoning, etc	(i) It contains axons outside and cell bodies inside. (ii) It control the reflex actions.

(c) (i) Phototropism (ii) Hydrotropism

(iii) Chemotropism (iv) Geotropism.

7. (a) Classify the following movements as tropic or nastic:

(i) Opening of flower.

(ii) Roots moving downwards.

(iii) Shoots moving towards light.

(iv) Twirling of a tendril.

(b) (i) Which plant hormone is present in greater concentration in the areas of rapid cell division?

(ii) Give one example of a plants growth promoter and a plant growth inhibition.

(c) Why is abscisic acid is also called as stress hormone?

Ans. (a) (i) Nastic (ii) Tropic

(ii)Tropic (iv) Nastic

(b) (i) Cytokinin is present in greater concentration in the areas of rapid cell division.

(ii) An example of a plant growth promoter is gibberellins and example of a plant growth inhibition is abscisic acid

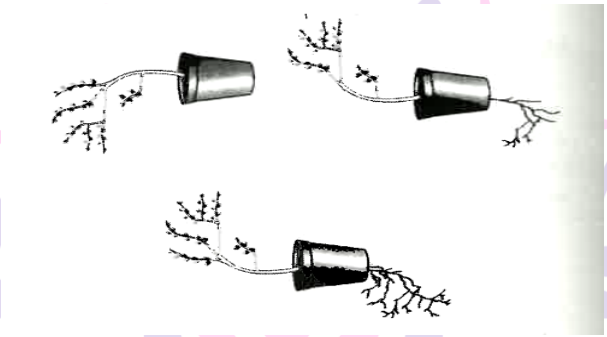
(c)(i) Abscisic acid is called as stress hormone because it signals the closure of stomata to prevent water loss during severe drought, intense sunlight and heat and other adverse environment conditions.

(ii) It acts as a growth inhibitor and inhibitor of plant metabolism.

8. (a) 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.

(b) How does the nervous system serve for coordination of all other systems in the body?

(c) The given experimental set-up establishers the response of different plant parts towards gravity.



(i) Give the scientific term used for such response/movement.

(ii) How is shoot response different from root response/movement?

Ans. (a) The two main organs of central nervous system are brain and spinal cord.

Spinal cord plays a major role in sending command to muscles to act without involving thinking process. This phenomenon is called reflex action.

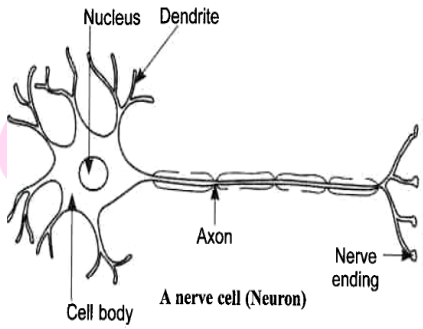
(b) (i) Nervous system receives information of changes in the external environment, analyse and interprets the information to produce sensations like vision or pain.

(ii) It also receives information of changes in the interior of the body and coordinates the activities of the visceral organs in the light of those changes and maintains a constant internal environment

(c) (i) Scientific term used for such movement is Geotropism.

(ii) Root shows positive geotropic movement while shoot negative geotropic movement.

9. (a)



A nerve cell (Neuron)

(i) Name the parts labelled A and B neutron drawn above.

(ii) Which part acquires the information in the neuron?

(iii)Through which part does this information travel?

(iv)Where is the impulse converted into a chemical signal for onwards transmission?

(b) What is reflex? How does it work in human?

Ans. (i) A-Dendrite B-Axon

(ii) The information in the neuron is acquired at the end of the dendrite tip.

(iii) The information travels from the dendrite to the cell body and then along the aon to its end.

(iv) The information travels in the form of an impulse.

(v) The impulse is converted into a chemical signal at the end of the axon.

(b) Sudden action in response to something. Nerves that detect an emergency situation is connected to nerves that move the muscles immediately

10. Suggest six reflex actions of the body. Explain how the reflex arc is the same in all of them.

Ans. Six reflex actions of the body are:

(i) When we see a speeding car moving towards us, we move aside.

(ii) We withdraw our hands on being pricked by a pin.

(iii) We withdraw our hands on touching very hot substance.

(iv) We close our eyes on seeing direct sun or extremely bright source of light

(v) We close our eyes on hearing a loud noise.

(vi) We shiver on feeling cold.

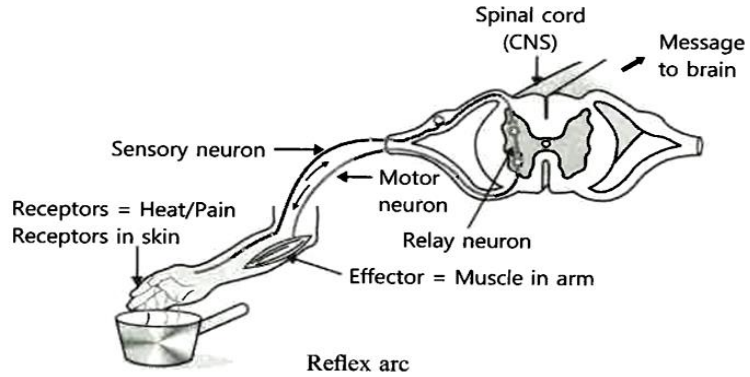
Reflex arc in all above cases is same because in all the cases, the stimulus is received by sense organs. Then this information is carried to spinal cord through sensory nerves.

Receptors —Sensory Neurons→ Spinal cord —Motor Neurons→ Effectors

Thus, information from spinal cord is send to the effectors such as muscles via motors nenrons.

11. What is a reflex are? Draw a neat labelled diagram of the components in a reflex are. Why do impulses flow only in one direction in a reflex are?

Ans. Reflex arc is the pathway taken by the nerve impulses and response in a reflex action, i.e from the receptor organs like skin to the spinal cord and from the spinal cord to the effector organs like muscles.



Reflex arc

Impulse flow only in one direction in reflex arc, because each synapse in the reflex arc allows impulses to cross it in a single direction.

12. What is meant by reflex-action? With the help of a labelled diagram trace the sequence of events which occur when we touch a hot object.

Ans. Reflex action is defined as an unconscious, automatic and involuntary response of effectors, i.e muscles and gland to a stimulus which is monitored through the spinal cord.

Sequences of events when we touch a hot object are:

(a) Receptor organ skin receives the stimulus and activates a sensory nerve impulse.

(b) Sensory neuron carries the message in the form of sensory impulse to the spinal cord.

(c) The spinal cord acts as a modulator. The neurons of spinal cord transmit the sensory nerve impulses to motor neuron.

(d) Motor nerve conducts these impulses to the effectors organ hand which responds by pulling back the hand away from the hot object.

13. What are hormones? Give the name of associated gland and functions of different animal hormones.

Ans. Hormones are the chemical substances which control and coordinate the activities of living organisms and also their growth. Name of five hormones with their releasing gland and function is tabulated below.

S.No	Name hormone	Releasing gland	Function of the hormone
1	Growth hormone	Pituitary gland	It stimulates growth in all organs. The height of a person depends on it. Normal secretion leads to normal height, excess secretion produces in very tall person and deficiency of its causes dwarfness. Main tissues related to it work are bones, cartilage, muscles, fat, liver and heart.
2	Thyroxine	Thyroid gland	It controls the rate of metabolism of carbohydrates, fats and proteins in the body.
3	Insulin	Pancreas	It acts to lower or raise blood sugar level. It also acts to inhibit glucagon and insulin release.
4	Testosterone	Testes	Regulates sex drive, bone mass, fat distribution, muscles mass and produces sperms. It also promotes development of secondary characteristics of male.
5	Progesterone and estrogen	Ovaries	Estrogen helps female in development of breast and reproductive organs in female. Estrogen also helps in maintenance of progeny. Progesterone prepares the female body for pregnancy by causing thickening of uterine lining.
6	Releasing hormone	Hypothalamus	It regulates the secretion of hormones from pituitary gland, i.e. hypothalamus controls the pituitary hormones
7	Adrenaline	Adrenal gland	It regulates the heart rate, breathing rate, blood pressure and carbohydrates metabolism.

14. Define tropism. Explain four kinds to tropisms with one example each.

Ans. The movement of plant in the direction of stimulus is known as tropism. Plants respond to light, tough, gravitational forces and other stimulus.

The four kinds of tropism are as follows.

(a) **Phototropism** : It is the movement of a plant in response to light.

For example. Plants need sunlight, the so the stem (or shoot) respond of sunlight by growing towards it.

(b) **Geotropism** : It is the movement of a plant in response to gravity.

For example : The movements of plant roots towards the earth and that of stem away from the earth.

(c) **Hydrotropism** : It is movement of a plant in response to water.

For example: The roots of plants always go towards water, even if it means going against the pull of gravity.

(d) **Chemotropism:** It is the movement of a plant in response to a chemical stimulus.

For example: The growth of a pollen tube towards the ovule induced by a sugary substance.

15. (a) Name the hormone which is released into the blood when its sugar level rises. Name the organ which produces this hormones and its effect on blood sugar level. Also mention the digestive enzymes secreted by this organ with one function of each.

(b) Explain the need of chemical communication in multicellular organisms.

Ans. (a) When sugar level rises, hormone insulin is released into blood. Insulin is secreted in lower quantity by pancreas, the blood sugar level of the concerned person increases. On the other hand if the insulin is secreted in excess, the person suffers from low sugar in blood. Pancreas secretes enzyme like trypsin for digesting proteins and lipase for breaking down emulsified fats.

(a) When sugar level rises, hormone insulin is released into blood. Insulin is released in our body by pancreas. When insulin is secreted in lower quantity by pancreas, the blood sugar level of the concerned person increases. On the other hand if the insulin is secreted in excess, the person surfs from lower sugar in blood.

Pancreas secrets enzymes like trypsin for digesting proteins and lipase for breaking down emulsified fats.

(b)Chemical communication is required in multicellular organisms to deal with emergency starvation, haemorrhage, extreme temperature, etc. The nervous coordination is fast but short lived. As the nerve fibres do not connect to cells of the body and the cellular functions need to be continuously regulated; a social kind of coordination and integration has to provided. This function is carried out by hormones. The nervous system and the endocrine system jointly coordinate and regulate the physiological functions in the body.

16. What is the major part of the brain? Mention the function of different parts.

Ans. The major parts of the brain are:

(i) **Forebrain** including cerebrum and olfactory lobes.

(ii) Midbrain

(iii) Hindbrain including cerebellum, pons and medulla oblongata.

Functions of different parts are as follows:

(a) Occipital lobe is the region for sight i.e. visual reception.

(b) Temporal lobe is the region for hearing i.e. auditory reception.

(c)Frontal lobe is the region for speech, facial muscular activities and higher mental activities.

(d) Parietal lobe is the region for taste, smell, touch and conscious association.

(e) Olfactory lobe receives sensation of smell.

(ii) Midbrain : It control reflex movements of the head, neck and trunk in response to visual and auditory stimuli

(iii) Hindbrain:

(a) Cerebellum controls the coordination of body movements and posture.

(b) Pons take part in regulating respiration.

(c)Medulla oblongata is the regulating centre for swallowing, coughing sneezing and vomiting.

17. Name various plants hormones. Also given their physiological effects on plants growth and development.

Ans. The various plants hormones are auxin, gibberellins, cytokinin and abscisic acid.

Their physiological effects on plats growth development are as follows:

Auxin- It is growth hormone which helps in cell enlargement and cell differentiation. Auxin also promote fruit growth.

Gibberellin – It also helps in the growth of the stem.

Cytokinin – It promotes the cell division. It is present in high concentration in the areas f rapid cell division such as fruits and seeds.

Abscisic acid (ABA) – They are responsible for inhibiting of checking the growth. It also causes wilting of the leaves.

18. Why is the flow of signals in a synapse from asexual end of the one neuron to dendrite end of another neuron but not the reverse?

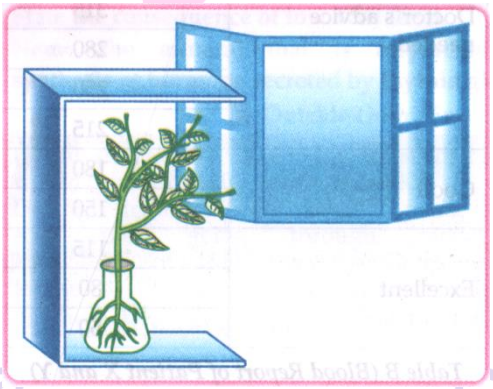
Ans. A chemical substance is released when the electrical signal reaches the axonal end of a neuron and this chemical diffuses to the dendrite end of another neuron, which generates electrical signal. Thus, at the axonal end, the electrical signals converted into chemical signals but at the dendrite end of neurons these chemicals are not present thus the reverse action is not possible.

Competency Based Questions

Case based MCQs

1. Read the given passage and answer any four questions from 1 to 5.

Plants perform chemical coordination for various activities with the help of hormones. Different hormones are produced by plants. These are the chemical compounds released by stimulated cells that different function. There is a hormone that is synthesised in the tip of shoots. When light comes from one side of the plant, this hormone diffuses towards the shady side of the shoot. Its concentration 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 while growing.



1. The name of the hormone being described is:

   a. **Auxin** b. Gibberellin c. Cytokinin d. Ethylene

2. The movement of shoot towards light is known as

a. Chemotropism **b. Phototropism**

c. Thigmotropism d. Geotropism

3. A young plant receives sunlight from one direction only. What will happen to its roots and shoots.

a. The shoot will bend towards light.

b. The root bends away from the light.

c. Both root and shoot will bend towards light.

d. Both (A) and (B)

4. The stimulus in growth of pollen tube towards ovule during fertilisation is:

a. Pollen **b. Chemical** c. Light d. Water

5. Which of the following is not associated with growth of plant?

a. Auxin b. Gibberellins c. Cytokinins **d. Abscisic acid**

II. Question numbers(1 – 4) are based on the two tables given below . Study these tables related to blood sugar levels and answer the questions that follow.

	Mean Blood Glucose Level(mg/dl)
Doctor's advise needed	380
	350
	315
	280
	250
	215
Good	180
	150
Excellent	115
	80
	50

Table A(Blood glucose chart)

Table B (Blood Report of Patient X and Y)

Time of check	Blood Glucose ranges (mg/dl)	
Before breakfast(Fasting)	Patient X	Patient Y
Before lunch, supper and snack	< 100	70 - 130
Two hours after meals	< 110	70 - 130
Bedtime	<120	90-15

1. Refer to table B showing the blood report of the levels of glucose of patients X and Y. Infer the disease which can be diagnosed from the given data.

   a. **Diabetes** b. Goitre

   c. Marasmus d. Acromegaly

2. Identify the hormone whose level in the blood is responsible for the above disease.

   a. Insulin b. Glucagon c. Thyroxine d. Adrenaline

3. Which one of the following diets would you recommended to the affected patient?

   a. High sugar and low fat diet.

   b. Low sugar and high protein diet.

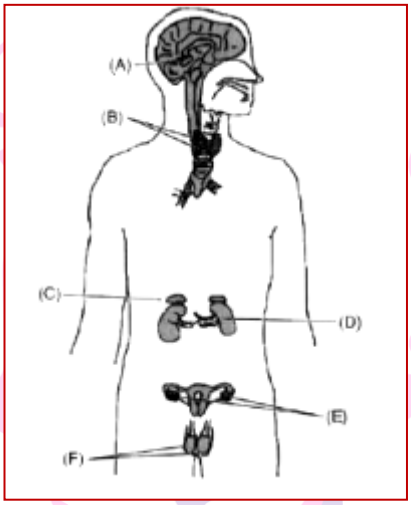
   c. High fat and low fibre diet.

   d. Low sugar and high fibre diet.

4. Refer to the Table A and suggest the value of the mean blood glucose level beyond which doctor's advice is necessary:

   a. 180 mg/dl b. 115 mg/dL c. 50 mg/dL d. 80 mg/dL

III. The given diagram represents the human endocrine system. Study the diagram and answer any four questions from Q.1 to Q.5.



1. Identify the endocrine glands A,B,C,D,E and F in the given diagram.

   a. A-Pituitary, B-Thyroid, C-Adrenal,D-Pancreas,E-Ovary,F-Testis

   b. A-Pituitary, B-Adrenal, C-Thyroid, D-Testis, E-Ovary, F-pancreas

   c. A-Pituitary, B-Thyroid, C-Adrenal,D-Ovary, E-Pancreas, F-Testis

   d. A-Pituitary, B-Adrenal, C-Thyroid, D-Pancreas, E-Ovary, F-Testis

2. The effect of chemical produced by gland F is:

   a. Secretes insulin which controls the amount of sugar in blood.

   b. Secrets testosterone which controls sperm production.

   c. Controls the activity of all other glands of our body.

   d. All of these.

3. Which gland secretes digestive enzymes as well as hormones?

   a. B b. C **c. D** d. E

4. Select the mismatched pair.

   a. A-Adrenaline b. F-Testosterone c. E-Estrogen d. B-Thyroxin

5. Which of the following endocrine glands is unpaired?

   a. Adrenal b. Testes **c. Pituitary** d. Ovary

Case based Subjective Questions

1. **Read the passage given below and answer the questions that follow.**

   Study the table in which the levels of Thyroid stimulating Hormone (TSH) in Women are given and answer the questions that follow on the basis of understanding of the following paragraph and the related studied concepts.

Age Range	Normal(mU/L)	Low (mU/L)
18 – 29 years	0.4 – 2.34 mU/L	<0.4 mU/L
30 – 49 Years	0.4 – 4.0 mU/L	<0.4 mU/L
50 – 79 years	0.46 – 4.68 mU/L	<0.46 mU/L

Women are at greater risk for developing abnormal TSH levels during menstruation, while giving birth and after going through menopause. Around 6% of women in the united states have some kind of thyroid problem compared to 3% of men. Despite claims that high TSH increases your risk for heart disease, a 2013 study found no link between high TSH and heart diseases. But a 2017 study showed that older women are especially at risk for developing thyroid cancer if they have high level along with thyroid nodules.

(1) A 35 year old woman has TSH level 6.03 mU/L. What change should she bring in her diet to control this level?

(2) When do women face a greater risk of abnormal TSH level?

(3) State the consequence of low TSH level.

(4) Name the mineral that is responsible for synthesis of hormone secreted by thyroid gland.

Ans. (1) She should take more iodine in her diet which would bring thyroxine level to normal.

(2) During menstruation, while giving birth and after going through menopause.

(3) Low level of TSH cause-Goitre disease

(4) Iodine

II. A living being does not live in isolation. It has to constantly interact with its external environment and has to respond properly for its survival. For example, when a hungry lion spots a deer, the lion has to quickly make a move so that it can have its food. On the other hand, the deer needs to quickly make a move to run for its life. The responses which a living being makes in relation to external stimuli are controlled and coordinated by a system; especially in complex animals. So, control and coordination is essential in maintaining a state of stability and a steady state between the internal conditions of an organism and the external environment. The neural system of all animals is composed of highly specialized cells called neurons, which can detect, receive and transmit different kinds of stimuli. In human body, neuron is the largest cell in the body. It is an elongated branched cell having three components. Neuron is therefore the structural and functional unit of the nervous system.

1. Name two tissues that provide control and coordination in multicellular animals.

   Ans. The two tissues that provide control and coordination in multicellular animals are nervous and muscular tissues.

2. Name the longest cell present in the human body.

   Ans. Neuron.

3. Name the two main organs of our central nervous system. Which one of them plays a major role in sending thinking process? Name the phenomenon involved.

Ans. The two main organ of CNS are brain and spinal cord. Spinal cord plays a major role in sending command to muscles to act without involving thinking process. This phenomenon is called reflex action.

4. State the functions of the structural and functional unit of nervous system.(Any two)

Ans. Function of neuron are follows.

(i) Cyton or cell body: It is mainly concerned with growth and maintenance of cell.

(ii) Dendrites: They receive the nerve impulses and transmit it to the soma of the neuron.

(iii) Axon: It conducts impulse away from the cell body.