

Previous Years' Questions

1. Cerebellum in hind brain controls the posture and balance of the body.
2. The growth of pollen tube towards a chemical produced by ovule during fertilisation of flower is an example of chemotropism.
3. The two components of Central Nervous System in human are brain and spinal cord.
4. Gustatory receptors are located in Cerebrum of fore brain. Olfactory receptors are located in Olfactory lobe fore brain.
5. Spinal cord is enclosed in a bony cage called vertebral column.
6. (i) Root (ii) Shoot
7. Insulin helps in regulating blood sugar level. This hormone is secreted by pancreas gland.
8. Hind-brain coordinates the body movements and posture. It also controls respiration.
9. Phototropism and geotropism.
10. The function of adrenaline hormone is to regulate blood pressure, heartbeat, breathing rate, carbohydrate metabolism and mineral balance in the body.
11. Abscisic acid
12. Shoot tip in plants and pituitary gland (anterior) in man.
13. Shoots will bend towards the light and roots away from the light.
14. The plant hormones which help or promote :
(i) Cell division — Cytokinins
(ii) Growth of the stem — Gibberellins
15. Thyroxine hormone regulates the carbohydrate, protein and fat metabolism in the body so as to provide the best growth balance.
16. The main hormone secreted by thyroid gland is **thyroxine**. It regulates the metabolism of carbohydrates, fats and proteins in the body so as to provide the best growth balance.
17. The two tissues that provide control and coordination in multicellular animals are nervous and muscular tissues.
18. Pituitary gland secretes the growth hormone.
19. (i) Movement on the touch-sensitive plant.
20. Iodised salt contains iodine which is necessary for the thyroid gland to synthesise thyroxine hormone. Thyroxine regulates carbohydrate, protein and fat metabolism in the body to provide growth balance. Its deficiency causes goitre.
21. Hormone oestrogen in females.
22. The function of growth hormone secreted by the pituitary gland regulates growth and development of the body.
23. Neuron is the largest cell in the body. It is an elongated branched cell having three components – Cell body, Dendrites and Axon. Neurons are, therefore, the structural and functional unit of the nervous system.

Important Questions

24. Pancreas
25. Cerebellum
26. Glucagon
27. Growth hormone regulates the development of bones and muscles.
28. Nissl's granules are found in cyton and dendrites. These are formed of ribonucleic acid (RNA).
29. Calcitonin and Parathormone
30. (a) Phototropism (b) Hydrotropism
(c) Chemotropism (d) Geotropism.
31. Glucagon is secreted in the α -cells of islets of Langerhans. Function of glucagon is to increase the blood glucose level.
32. Reflex action enables the animal to respond quickly and relieves the brain from excess work.
33. Cerebrospinal fluid
34. Cerebral hemisphere
35. Ovaries
36. Sensory neurons
37. Cerebellum
38. Sensory neurons
39. Medulla oblongata is the most important part of the brain because it controls all the involuntary actions like heartbeat and breathing.
40. Spinal cord is a part of the central nervous system and is the centre for reflex actions. It is protected by a bony cage inside the neural cavity of the vertebral column.
41. Brain and spinal cord controls all the activities of the body by cranial nerves and spinal nerves.
42. Thyroxine
43. Insulin and Glucagon
Its function is to balance the blood glucose level in the body.
44. The pituitary gland controls the activity of other endocrine glands; so, it is called the master gland.
45. Hormones are carried in the blood streams to all parts of the body, so they are called 'chemical messengers'.
46. Adrenaline
47. Adrenal – Above kidney and
Pituitary – Brain.
48. Thyroid – Either side of trachea just below larynx.
Adrenal – Above Kidney.
49. Endocrine glands are called ductless glands because they do not have any external duct to discharge their secretions into the blood stream.
50. Hypothalamus regulates the secretion of hormones from pituitary gland.
51. Hypothalamus
52. Hypothalamus
53. (a) Light (b) Gravity (c) Chemicals
54. Auxin
55. Nastic movement
56. Neurons
57. Thyroxine from thyroid glands.
58. Vasopressin from Pituitary glands.

NCERT Questions

59. (d) Cytokinin is a plant hormone.
60. (b) Synapse is the gap between two neurons.
61. (d) The brain is responsible for thinking, regulating the heart beat and balancing the body.
62. At the synapse, the two neurons join together.
63. Cerebellum, which is a part of the hind-brain maintains the posture and equilibrium of the body.
64. We can detect the smell of an *agarbatti* (incense sticks) by the olfactory lobes of the forebrain. The particles of fragrance from *agarbatti* strike the nerve cells of olfactory receptor and through motor neurons, impulses are sent to brain where olfactory lobes of forebrain analyse and produce the sensation of smell.
65. Plant hormone auxin and gibberellin promotes growth of a plant.
66. All the signals and responses which pass from and to the brain through the spinal cord will get disturbed. Reflex actions will get disrupted.

[2 MARKS]

SHORT ANSWER TYPE QUESTIONS (I)

Previous Years' Questions

1. The two main organs 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.
 2. Testes secrete male sex hormone called testosterone. The function of testosterone is to regulate male accessory sex organs and secondary sexual characters like moustache, beard and voice.
 3. Hormones secreted by pituitary gland along with their functions are –
 - (i) **Growth hormone** : It regulates growth and development of bones and muscles.
 - (ii) **Trophic hormone** : It regulates secretion of hormones from other endocrine glands.
 - (iii) **Prolactin hormone** : It regulates the function of mammary glands in females.
 - (iv) **Vasopressin hormone** : It regulates water and electrolyte balance in the body.
 - (v) **Oxytocin hormone** : It regulates ejection of milk during lactation.
 4. • Auxin diffuses towards shady side.
• Causes elongation on one side (shady side) resulting in bending of growing shoot.
• The hormone responsible for bending is auxin and the movement is phototropic movement.
 5. (a) Scientific term used for such movement is Geotropism.
(b) Root shows positive geotropic movement while shoot shows negative geotropic movement.
 6. Any two parts of human hindbrain with their functions are as follows :
 - (i) Cerebellum which controls the coordination of body movement and posture.
 - (ii) Medulla oblongata, which regulates the centre of swallowing, coughing, sneezing and vomiting.
 7. Plant hormones can be defined as a chemical substance which is produced naturally in plants and are capable of translocation and regulating one or more physiological processes when present in low concentration.
- Two important functions of auxin are that it promotes cell elongation, root formation, cell division, etc.
8. '**Nastic**' movement is the non-directional movement of turgor or growth where the movement is determined by the structure of the responding organ irrespective of the direction of stimulus which is generally diffuse.
Example : Bending and drooping of leaves on touching in 'touch-me-not' plant (*Mimosa pudica*)
Curvature movements are changes in orientation of different plant parts in relation to one another like bending, twisting and elongation. They are of two types – turgor and growth movements.
Example : Telegraph plant (*Desmodium gyrans*)
 9. The cause of shoots of the plant bending towards light is due to the directional growth or movement of a plant organ in response to an external stimulus known as phototropism.
 10. A change in the environment of a living organism evolves an appropriate movement in response. The movement to be made depends on the event, i.e., triggering it. Such control movement must be connected to various events in the environment. Thus, living organism must use system providing control and coordination.
 11. The three major regions or parts of the human brain are — Fore-brain, Mid-brain and Hind-brain. A part of the hind-brain called the cerebellum maintains posture and equilibrium of the body.
 12. (a) **Voluntary actions** are the actions which need thinking and are performed knowingly, i.e., are controlled by conscious thought.
Example. Speaking to a friend, writing a letter, etc.
Involuntary actions are not under the control of the will of an individual and are automatic response to a stimulus which is not under the voluntary control of the brain.
Example. Touching a hot plate unknowingly.
(b) **Involuntary actions** : Beating of heart, salivation in the mouth on viewing a tasty food.

Important Questions

13. In plants, control and coordination is brought about by means of chemical substances called phytohormones. In addition, environmental factors like water, temperature and light, controls growth and development.
14. **Functions of Testosterone** (Male sex hormone) :
 - (i) Sperm production
 - (ii) Development of masculine features like moustache, beard and voice.

Functions of Estrogen (Female Sex hormone) :

- (i) Egg production
 - (ii) Development of secondary sexual characters, *i.e.*, feminine ones like mammary glands, soft skin, hair pattern and feminine voice.
15. Two types of neurons are :
- (i) **Sensory neurons** - These pass information from the receptors to the brain.
 - (ii) **Motor neurons** - These transmit information from the brain to the effector organs.
16. Spinal cord is the control centre of a reflex action. The route taken by the reflex action is called reflex arc.
17. Pancreas releases 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.
18. (a) Progesterone is associated with maintenance of pregnancy.
(b) Testosterone regulates male sex characters.
19. 'Releasing hormones' are chemical substances which regulate the secretion of hormones from pituitary gland. They are released from hypothalamus gland.
20. (a) Nastic (b) Tropic (c) Tropic (d) Nastic
21. Pons are situated below the cerebellum and above the medulla oblongata in the hind-brain. They are responsible for regulating the respiratory activity.
22. Pancreas secretes digestive enzymes as well as insulin and glucagon hormones. Similarly, gonads produce gametes as well as male and female sex hormones. Thus, pancreas and gonads perform 'dual functions'.

Cerebrum

- 29.
- (i) It is the largest highly developed and prominent part of the brain.
 - (ii) It is the controlling centre for senses. It is responsible for memory, intelligence, hearing, etc.

Motor nerve

- 30.
- (i) It consists of only efferent (motor) nerve fibres.
 - (ii) It conducts motor impulses from CNS to the effectors to produce some action.

Estrogen

- 31.
- (i) It is secreted by developing graafian follicles of the ovary.
 - (ii) It stimulates the growth, maturation and functions of female secondary sex organs.

Vasopressin

- 32.
- (i) Vasopressin regulates water and electrolyte balance in the body.
 - (ii) It enhances arterial blood pressure by constricting or narrowing the peripheral arterioles.

Exocrine glands

- 33.
- (i) They may or may not have ducts.
 - (ii) They secrete enzymes.
 - (iii) They either function *in situ* and pour their secretions directly near its target or through a duct.

23. Prolactin regulates function of mammary glands. Oxytocin regulates the ejection of milk during lactation.
24. Specific tissue or organ on which hormones act are called target organs, *e.g.*, digestive system.
25. Stem and root show unilateral growth towards light and gravity of earth respectively due to unequal concentration of auxins (hormones) in both sides of stem and root apices.
In **stems**, auxins concentrate more on the lower side of stem apex causing bending towards upper side (towards light).
In **roots**, auxins concentrate more on the lower side of root tip, inhibiting growth, upper side grows more, so it bends downwards (towards gravity).
26. Cerebrum is the largest part of the brain. Its various regions carry out different activities, *i.e.*, occipital lobe for vision, temporal for auditory reception, parietal for touch, smell, temperature and consciousness and frontal lobe for muscular activities.
27. Auxins are the group of plant hormones which occur naturally in the plant body. They are synthesised from the root and shoot-tips of the plant body.
28. Glucagon promotes breakdown of glycogen and release of glucose into blood. It also promotes the formation of glucose from amino acids and thus, increases the blood sugar level. Insulin promotes formation of glycogen from glucose and removes glucose from blood. It promotes formation of proteins from amino acids and fats from glucose and fatty acids and thus, decreases the blood sugar level.
As the two hormones function in opposite direction – glucagon increases blood sugar and insulin reduces blood sugar, so, they are said to be antagonistic to each other.

Cerebellum

- (i) It is the second largest part of the brain and lies at the posterior part of the brain.
- (ii) It controls the skeletal, muscle activities and maintains the equilibrium of the body.

Mixed nerve

- (i) It consists of both afferent (sensory) and efferent (motor) nerve fibres.
- (ii) Its sensory fibres bring sensory impulses from receptors to CNS and motor fibres from CNS to effectors.

Progesterone

- (i) It is secreted by the corpus luteum.
- (ii) It maintains pregnancy and regulates mammary glands and menstruation cycles.

Oxytocin

- (i) Oxytocin regulates the ejection of milk during lactation.
- (ii) It decreases the arterial blood pressure by dilating or widening the peripheral arterioles.

Endocrine glands

- (i) They are ductless glands.
- (ii) They secrete hormones.
- (iii) They pour their secretions directly into blood.

34. **Sympathetic Nervous System**

- (i) It consists of double chain of ganglia situated on either side of spinal cord.
- (ii) Nerve fibres connect these ganglia with the CNS and visceral organs.
- (iii) It prepares the body for an abnormal situation.

35. **Cerebrum**

- (i) It contains cell bodies of neurons outside and axons of the neurons inside.
- (ii) It is the region for memory, speech, reasoning, etc.

36. **Spinal nerve**

- (i) They arise from spinal cord.
- (ii) There are 31 pairs of spinal nerves.

37. **Nervous system** coordinates the activities of all body organs by means of certain specialised cells called **neurons**. They receive stimulus or messages and are then sent to central nervous system and from there responses are sent to effector organs to complete the work. Its effect is quick and do not lasts for a long period. **Endocrine system** releases the hormones in the blood which regulate all the body activities like nervous system. Its effect is slow but lasts for a long time.

- 38. (i) Nervous system receives information of changes in the external environment, analyses 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.

39. Cranial nerves are those nerves which arise from different parts of the brain.

A human being has 12 pairs of cranial nerves.

40. Spinal nerves are those nerves which arise from each of the segments of spinal cord.

There are 31 pairs of spinal nerves in a human being.

All the spinal nerves are mixed.

41. Antagonism refers to the influence of two hormones on a particular metabolism in opposite directions, e.g.,

(i) **Insulin** reduces the level of blood sugar whereas **glucagon** increases the level of blood sugar.

(ii) **Calcitonin** decreases the plasma level of Ca^{++} ions whereas, **parathormone** increases the level of Ca^{++} ions in plasma.

42. Synthesis and release of some hormones are regulated by nerves and hormones also influence nervous activity.

For example, the presence of food in stomach causes distention of gastric walls. This stimulates secretion of gastrin hormone which in turn stimulates secretion of gastric juices in the stomach. Similarly, increase in the concentration of thyroxine stimulates the respiratory centre of the brain to increase the rate of breathing.

43. Parathyroid glands are located behind or embedded within the thyroid gland. They produce parathormone.

Parasympathetic Nervous System

- (i) Ganglia of this system are also paired but are situated nearer to visceral organs.
- (ii) Its original place is in the brain and the posterior parts of the spinal cord.
- (iii) It prepares the body for normal functioning after abnormal situation.

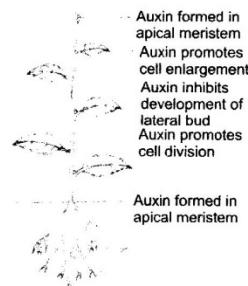
Spinal cord

- (i) It contains axons outside and cell bodies inside.
- (ii) It controls the reflex actions.

Cranial nerve

- (i) They arise from brain.
- (ii) There are 12 pairs of cranial nerves.

44.



Effect of auxins in different parts of the plant

- 45. Hypothalamus secretes hormones called **releasing hormones**. The releasing hormones regulate the secretion of hormones by the pituitary gland, which in turn controls the secretion of hormones by many other endocrine glands.
- 46. **Receptors** are a group of cells which is sensitive to a particular type of stimulus. Receptors are a kind of sense organs.
Examples : Skin and eyes.
Effectors are the part of the body which respond to the stimulus.
Examples : Muscles and glands.
- 47. The endocrine glands release hormones directly into the blood of a person. These hormones reach the concerned organ through the blood circulatory system.
- 48. Hypothalamus gland is present in the brain. It produces 'releasing hormones' and 'inhibitory hormones'. The function of hypothalamus is to regulate the secretions of hormones from pituitary gland, i.e., hypothalamus controls the pituitary hormones.
- 49. The four hormones secreted from pituitary gland along with their functions are as follows :

Hormone	Function
(i) Growth hormone	Development of bones and muscles.
(ii) Prolactin	Regulation of functioning of mammary gland.
(iii) Oxytocin	Regulates ejection of milk and birth hormone.
(iv) Vasopressin	Regulation of water and electrolyte balance.

50. The four regions of fore-brain and their functions are :

- (i) **Occipital lobe.** Visual reception.
- (ii) **Temporal lobe.** Auditory reception.
- (iii) **Parietal lobe.** Region for touch, smell, temperature and conscious association.

(iv) **Frontal lobe.** Region for muscular activities.

51. Pancreas releases insulin which lowers the blood glucose. It also releases glucagon which increases blood glucose. Thus, pancreas is the overall controller of blood glucose level.

NCERT Questions

52. A reflex action is an automatic response to a stimulus which is not under the conscious control while walking is a voluntary action which is controlled by brain.
53. The nerves from all over the body meet in a bundle in the spinal cord : Reflex arcs are formed in the spinal cord itself although the information input also goes to reach the brain.
54. The movement of leaves of the sensitive plant is neither towards nor away from stimulus like touch. While movement of shoot is towards stimulus like light. The movement of leaves of sensitive plants is not directional while the movement of shoot is directional.
55. Auxins synthesised in the shoot-tip helps the cells to grow longer. Some plants like the pea plant climb up other plants or support by means of tendrils. These tendrils are sensitive to touch. When they come in contact with any support, the part of the tendril in contact with the object does not grow as rapidly as the part of the tendril away from the object. This causes the tendril to circle around the object and thus cling to it, due to the accumulation of auxins.
56. Adrenaline is secreted directly into the blood and is carried to different parts of the body. It acts on the heart and thus, it beats faster in order to supply more oxygen to our muscles. These muscles regulate the various movements of our body.

57. Insulin hormone is secreted by Islets of Langerhans of pancreas. This hormone helps in regulating sugar level in the blood. Its deficiency results in high sugar level and cause many harmful effects.
58. The directional or tropic movement towards the light or away from the light is called phototropism. The shoots respond by bending towards light, while roots respond by bending away from the light.
59. The different organs of our body work in coordination when we perform any activity. For example, when we are taking food, our eyes help in locating the food, our nose detects the smell, our hand brings the food to our mouth, the teeth and jaw muscles chew the food and saliva starts the digestive process. 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.
60. **Involuntary action** are not under the control of the will of an individual and are automatic response to a stimulus which is not under the voluntary control of the brain.
Example. Touching a hot plate unknowingly.
Reflex action 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.

SHORT ANSWER TYPE QUESTIONS (II)

[3 MARKS]

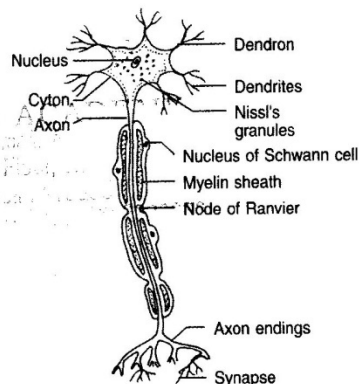
Previous Years' Questions

1. (i) He is suffering from diabetes. Deficiency of insulin causes diabetes.
(ii) Pancreas secretes insulin. Insulin helps in regulating blood sugar.
(iii) When the sugar level in blood increases, it is detected by the cells of the Pancreas which responds by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.
2. Plant hormones help to coordinate growth, development and responses in environment. Four different types of plant hormones are – Auxins, Gibberellins, Cytokinins and Abscisic acid.
(i) **Auxins** are the group of plant hormones synthesised at the shoot-tip of the plant body. It promotes cell elongation, root formation, cell division, respiration and other physiological processes like protein synthesis, water uptake and protoplasmic permeability. Auxins also play an important role in the development of seedless fruits.
(ii) **Gibberellins** stimulate stem elongation, seed germination and flowering. The maximum concentration of gibberellins is found in fruits and seeds.
(iii) **Cytokinins** are produced in dividing cells throughout the plant. In mature plants, cytokinins are produced in the root tips and are transported to the shoots. Cytokinins promote cell division and also helps in breaking the dormancy of seeds and buds and regulate the phloem transport. Cytokinins delay the ageing in leaves and promote the opening of stomata.
(iv) **Abscisic Acid** is a growth inhibitor which reverses the growth-promoting effects of auxins and gibberellins. Its effect

include wilting of leaves. It causes dormancy of seeds. It also promotes the closing of stomata.

3. (a) The brain sits inside a bony box. Inside the box, the brain is contained 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 : 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.

4. (a)



A nerve cell (Neuron)