

Control and Coordination Extra Questions

1. What is tropism?

Answer: Tropism is the directional movement or orientation of the part of a plant caused by its growth in response to a specific stimulus.

2. Which part of the plant shows positive geotropism and why?

Answer: The roots of plants show positive due to differential growth caused by unequal distribution of auxins (plant hormone).

3. What are phytohormones? Mention the various phytohormones.

Answer: Phytohormones are naturally occurring organic chemical substances in plants which bring about control and coordination of various activities in them. Examples of phytohormones are - Auxins, gibberellins, cytokinins, ethylene and abscisic acid.

4. Define the term photoperiodism.

Answer: The phenomenon of physiological change occurring in plants (eg., flowering in plants) in response to day length (photoperiod) is called photoperiodism.

5. Name the stimulus in: (a) Geotropism (b) Phototropism (c) Chemotropism.

Answer:

- a) Gravity
- b) Light
- c) Chemical substance

6. What are growth regulators?

Answer: The synthetic chemical substances which resemble phytohormones in molecular structure and physiological action are called growth regulators.

7. What are plant growth promoters and plant growth inhibitors? Give examples.

Answer:

(i) Plant growth promoters are plant hormones which stimulate plant growth.

Eg., auxins, gibberellins, cytokinin, ethylene.

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9. Name the secretion of endocrine glands.

Answer: Hormones

10. Name two parts of the autonomic nervous system.

Answer: Sympathetic nervous system and parasympathetic nervous system.

11. Mention an alternative name for vasopressin.

Answer: Antidiuretic hormone (ADH)

12. Name the endocrine gland which secretes neurohormones.

Answer: Hypothalamus

13. Name the hormones secreted by the posterior lobe of the pituitary gland.

Answer: Oxytocin and vasopressin

14. Which cells contain Nissl's granules?

Answer: Nerve cells(neurons)

15. Name the hormone that controls water and electrolyte balance in the body.

Answer: Aldosterone

16. Endocrine glands release their secretions into the blood. Why?

Answer: Endocrine glands are ductless glands and their products must act at a distant site. Therefore, they release their secretions into the blood.

17. Why movements in plants are not as apparent as in the case of animals?

Answer: Plants lack a nervous system. They simply respond to external stimuli which is usually seen in their growth. Therefore, plants show movements at a very slow rate.

18. Which lobe of the cerebral hemisphere is the region for speech?

Answer: Frontal lobe

19. Name the scientists who first introduced the term 'hormone'.

Answer: William M Bayliss and Ernst H Starling

20. Name the hormone that helps in lowering the level of blood glucose in human beings.

Answer: Insulin hormone

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21. Which are the systems involved in control and coordination in animals?

Answer: The systems involved in the control and coordination of animals are the nervous system, muscular system and endocrine system.

22. What are effectors?

Answer: Effectors are muscles or glands that produce a response to the stimulus.

23. What are synapses?

Answer: It is a junction between two neurons, between the nerve endings of one axon and the dendrites of another neuron. There is a small microscopic gap between the two.

24. What happens at a synapse between two neurons?

Answer: At the end of the axon, the electrical impulse releases some chemicals. They go across the gap or synapse and trigger another similar electrical impulse in the dendrite of the next neuron.

25. In which form are the nerve impulses travelling?

Answer: Impulses travel in the form of electric impulses and chemicals known as neurotransmitters.

26. What is a nerve impulse?

Answer: The information passes through neurons in the form of chemical and electrical signals known as nerve impulses.

27. What is the difference between a reflex action and walking?

Answer: Reflex action is an involuntary action whereas walking is a voluntary action.

28. Distinguish between voluntary and involuntary actions of our body.

Answer: Voluntary actions are under the control of our will, it needs thinking eg: talking and walking.

Involuntary actions are not under the control of our will, they are automatic eg: salivation, and heartbeat.

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29. Why is the use of iodized salt advisable?

Answer: Iodine from the iodized salt is absorbed in our body which helps in the formation of thyroxin hormone secreted by the thyroid gland.

30. “There is a need for a system of control and coordination in an organism”.

Justify the statement.

Answer:

Larger and more complex organisms have specific organs for specific functions. All organs should function in perfect coordination. A system of control and coordination is necessary to facilitate this.

31. How do neurons transmit information?

Answer: Information passes through neurons in the form of electrochemical signals. These signals are called impulses.

When an impulse reaches the end of the axon, it sets off the release of some chemicals.

They go across the gap or synapse and trigger another similar electrical impulse in the dendrite of the next neuron.

Similarly, a synapse also delivers impulses from the neurons to other cells such as muscle cells or glands.

32. Differentiate between sensory and motor nerve.

Answer: The sensory nerve transmits information from receptors to the brain. Motor nerves transmit the information for action to be taken from the brain to the muscles.

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33. Give protective features of the nervous system.

Answer: The brain is protected by the bony cranium and is also covered by three membranes called meninges. The cerebrospinal fluid which protects the brain from mechanical shocks occupies the space between the meninges. The meninges and the cerebrospinal fluid protect the spinal cord as well. Moreover, the vertebral column also protects the spinal cord.

34. How do nervous tissues bring about muscular movements?

Answer: The muscle fibres move when a nerve impulse reaches it. The special proteins present in the muscle cells facilitate these movements. These proteins change their shape and arrangement making the muscle cell shrink. This makes the muscle cells contract.

35. How is the secretion of hormones regulated?

Answer: The feedback mechanism regulates the secretion of hormones. For eg: the rise of sugar levels in the blood stimulates the pancreas to secrete insulin. When the blood sugar level falls, insulin secretion is reduced.

36. Define the following.

Control b) **Coordination** c) **Nervous system** d) **stimulus** e) **response** f) **neuron**

Answer:

a) **Control:** It is the ability of an organism to start, accelerate or slow down the change in the body.

b) **Coordination:** It is the working together of various parts of the body of an organism in an orderly manner

c) **Nervous system:** A system of nervous organs, nerves, and nerve cells that controls and coordinates activities by transmitting information in the form of electrical impulses.

d) **Stimulus:** change in the environment.

e) **Response:** Reaction to the stimulus.

f) **Neuron:** structural and functional unit of the nervous system.

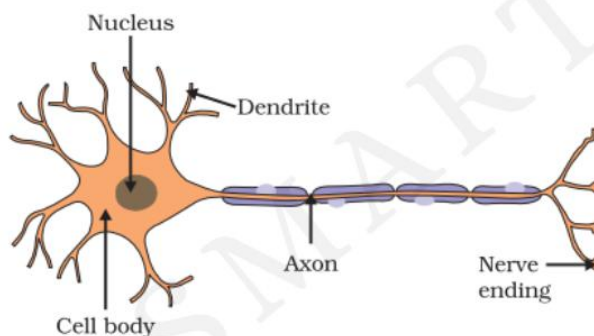
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37. What are receptors? Think of a situation when the receptors do not function properly. Name the receptors.

Answer: Receptors are special cells present in our sense organs to detect information from the environment. When they don't work properly, environmental stimuli are not detected.

For example, during the common cold, the olfactory receptors don't function properly and we are unable to detect smell. The various receptors are
Photoreceptors –to detect light
Photoreceptors-to detect sound
Olfactory receptors –to detect smell
Thigmoreceptors-to detect touch.

38. Draw a well-labelled diagram of a neuron



39. Differentiate between axons and dendrites.

Answer: Axon- It is an unbranched protoplasmic process arising from cyton. Axon takes impulses away from the cell body of a neuron.

Dendrites are short, branched, protoplasmic processes of the cyton. They take nerve impulses towards the cell body of a neuron.

40. Name three types of neurons.

Answer: Sensory neurons –Transmit impulses from receptors towards the spinal cord and brain.

Motor neuron-Transmit impulses from the spinal cord and brain towards the effectors(muscles and glands)

Relay neuron-occurs in the brain and spinal cord where they serve as links between the other neurons.

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41. What is a reflex action? Give examples.

Answer: A reflex action is a quick and involuntary response to a stimulus by an effector.

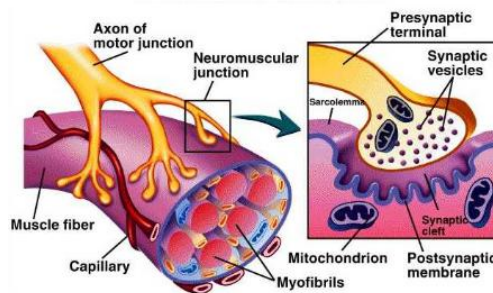
Eg. Withdrawing our hand from a hot object

Closing the eye when a moving object approaches the eye on a collision course.

Blinking the eyelids when a moving object approaches the eye.

Knee jerk reflex

42. Draw the neuromuscular junction and label its parts.



43. Describe how auxins are related to the bending of shoots towards the source of light.

Answer: When the growing shoot is exposed to the source of light coming from one side, it results in the unequal distribution of auxins on the two sides. The shaded side has more auxin as compared to the lighted side. More auxin causes more growth in the shaded side of the shoot resulting in the bending of the stem towards the source of light.

44. Explain apical dominance. Name the hormone that controls it.

Answer: Apical dominance is the phenomenon of suppression of growth in nearby lateral buds due to the presence of apical bud. The phytohormone named auxin controls apical dominance.

45. The human brain can be broadly divided into three regions. Name them.

Answer: The three regions of the human brain are the forebrain, midbrain and hindbrain.

46. Name the endocrine gland which has islets of Langerhans. Name its secretions.

Answer: Pancreas—its hormonal secretions are insulin and glucagon.

47. Write a note on the significance of the central nervous system.

Answer: It directs incoming messages to the motor neurons that are connected to the receptors. It collects all the information from all the receptors and integrates it. In this way, the best action can be taken in a particular situation

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48. Write a note on the peripheral nervous system.

Answer: The communication between the CNS and other parts of the body is facilitated by PNS ie(all the nerves of our body constitute PNS).

It consists of:-

- Cranial nerves-That arise from the brain and spread throughout the head
- Spinal nerves originate from the spinal cord and are spread throughout the body, except to the head.
- Visceral nerves arise from the spinal cord and are connected to internal organs like the heart, and lungs.

PNS is of two types:

- Voluntary Nervous system –Actions are under the conscious control of the brain
- Autonomic nervous system (Involuntary)-actions do not need thinking ex-functions done by the internal organs are involuntary.

49. Write a short note on the brain.

Answer: The brain is broadly divided into three main parts- fore, mid and hindbrain.

Fore brain-It is the site of learning, reasoning, personality and memory

All thoughts sensations, actions and movements are controlled by the cerebrum. In the cerebrum, different areas perform different functions.

a) There are separate areas for association which is interpreted by putting together information from other receptors as well as information that is already stored in the brain

b) There is an area known as the motor area, where instructions are sent to the muscles to do various jobs.

c) There is an area known as the sensory area which receives sensory impulses from various receptors The cerebrum controls all voluntary actions.

- In the forebrain, we have the hypothalamus which controls thirst, hunger and sleep.
- Pituitary gland is attached to it which is the master gland and secretes growth hormone.
- Mid brain-It controls involuntary actions like reflex movements of the head, neck and trunk in response to visual and auditory stimuli. It also controls reflex movements of eye muscles ie changes in the size of the pupil.
- Hindbrain –It consists of pons, cerebellum and medulla
- Pons regulates respiration
- The cerebellum helps maintain posture and body balance. It enables us to make precise and accurate movements like walking dancing etc.
- Medulla controls various involuntary actions such as heartbeat, breathing, blood pressure and peristaltic movements, It is also a control centre for reflexes such as swallowing, coughing, sneezing, secretion of saliva and vomiting.

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50. How are the brain and spinal cord protected?

Answer: The brain is protected by a bony box called the cranium. It is surrounded by 3 meninges and the space between the meninges is filled with cerebrospinal fluid which protects the brain from mechanical shocks. The spinal cord is protected inside the vertebral column and meninges.

51. What is the spinal cord? State its functions.

Answer: The spinal cord is cylindrical and made up of nerves that supply information to think about. The functions of the spinal cord are spinal reflex action and conduction of impulses to and from the brain.

52. How does nervous tissue cause action?

Answer: Muscles are made up of muscle cells. They contain special (contractile proteins) proteins that can change their arrangement when stimulated by electric impulses causing the muscle cells to change their shape and contract. When the muscle cells contract they pull the bones of the body and make it move.

53. How are control and coordination brought about in plants?

OR

How control and coordination in plants is different from animals?

Answer: Plants don't have nervous systems like animals. They coordinate their behaviour against environmental changes using only hormones whereas animals use the nervous system and hormones. They show two different types of growth movements.

- Dependent on growth. Eg. Growth of a seedling
- Independent of growth ex-drooping of the touch me not plant.

The 2 types of movements shown in response to external stimuli are i)Tropic movement and ii)Nastic movement.

54. Write a note on tropic movement.

Answer: A growth movement of a plant part in response to external stimuli in which the direction of stimulus determines the direction of the response. If the growth is towards the stimulus then it is called positive tropism and if the growth is away, it is negative tropism.

It is divided into types:

- Phototropism- the movement of the plant in response to light. Eg. Roots
- Geotropism-movement of plant in response to gravity
- Chemotropism-movement of the plant towards chemicals.
- Hydrotropism-movement of the plant in response to water
- Thigmotropism-movement of the plant part in response to touch.

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55. Write a note on nastic movement.

Answer: Movement of plant part in response to external stimuli in which the direction of the response is not determined by the direction of the stimulus. It can be growth or growth-independent nastic movement.

Folding of leaves of *Mimosa pudica* -it is a growth-independent nastic movement. The opening and closing of petals of flowers by the action of sunlight is a growth-related nastic movement.

56. What are the limitations of electrical impulses?

Answer: They will reach only those cells that are connected to the nervous tissue and not each cell of the body. Once the cell generates and transmits an electrical impulse it will take some time to reset its mechanisms.

57. What are the advantages of hormones and how it work?

Answer:

Hormones are chemical messengers that regulate the biological process in living organisms. Hormones are information molecules secreted by ductless endocrine glands in specific parts of the body in response to changes in external and internal environment. These chemical messengers are carried by blood to another part where they stimulate or inhibit specific physiological processes for the good of the body as a whole.

If stimulated cells release a chemical compound instead of generating an electrical impulse, this compound will diffuse all around the original cell.

If other cells detect this compound using special molecules on their surface, they can recognize information and even transmit it.

This will be slower but can potentially reach all the cells of our body regardless of nervous connections and can be done steadily and persistently.

They are synthesized at places from where they act and simply diffuse to the area of action.

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Types of glands, hormones and their functions

GLANDS	HORMONES	FUNCTIONS
Hypothalamus		Regulate the functions of hormones from the pituitary gland
Pituitary Gland	Growth hormone	Controls the growth of the human body
Thyroid Gland	Thyroxine	Controls the rate of metabolism of carbohydrates, fats and proteins in the body. Iodine is necessary for making thyroxine hormone by the thyroid gland.
Parathyroid glands	Parathormone	To regulate calcium and phosphate levels in the blood
Thymus gland	Thymus hormone	Plays an important role in development of the immune system of the body
Pancreas	Insulin	Controls blood glucose level Deficiency of insulin hormone causes a disease known as diabetes, the condition of having large quantities of sugar in the blood
Adrenal gland (gland of emergency)	Adrenaline (flight or fight hormone)	Regulates breathing rate, heartbeat, blood pressure and carbohydrate metabolism.
Testes	Testosterone (male sex hormone)	Control the development of male sex organs and secondary sexual characters in males
Ovaries	Oestrogen and progesterone	Oestrogen helps to control the development of female sex organs and secondary sexual characteristics in females Progesterone –Controls the menstrual cycle and maintenance of pregnancy.

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58. Mention the receptors for light, smell, touch, heat and sound in animals.

Answer:

- (i) Photoreceptors for light
- (ii) Olfactoreceptors for smell
- (iii) Tactile receptors for touch
- (iv) Thermoreceptors for heat
- (v) Phono receptors for sound

59. Differentiate between tropic movements and nastic movements.

Answer:

Tropic movements	Nastic movements
1. These are directional movements of plant parts in response to specific stimuli. The movement can be towards or away from the stimulus.	1. These are not directional movements i.e., these movements are neither towards the stimulus nor away from the stimulus.
2. These are plant movements of curvature caused by unilateral growth, i.e., one side of an organ grows faster than the other causing curvature.	2. These movements are caused due to variations in environmental conditions, i.e., these are also movements of curvature but these occur due to turgor changes.
3. Eg: Bending of the stem towards light and downward growth of roots in response to gravity.	3. Eg: Folding and drooping of leaves of Mimosa plant in response to touch.

60. Name the different parts of the brain. Give functions of each part.

Answer:

The brain is divided into three regions: forebrain, midbrain and hindbrain

Forebrain:

The forebrain includes the cerebrum and the olfactory lobes.

The cerebrum is the largest part of the brain and consists of two cerebral hemispheres.

The sensory areas in the forebrain receive information from sense organs.

Similarly, there are motor areas from where impulses are sent to effector organs.

There are specific regions for each kind of stimulus and its response is located in the cerebrum. Eg: There are specialized regions for hearing, sight, and smell.

Midbrain:

It is made up of thalamus and hypothalamus

It connects the forebrain to the hindbrain.

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Hindbrain:

It consists of the cerebellum, pons and medulla.

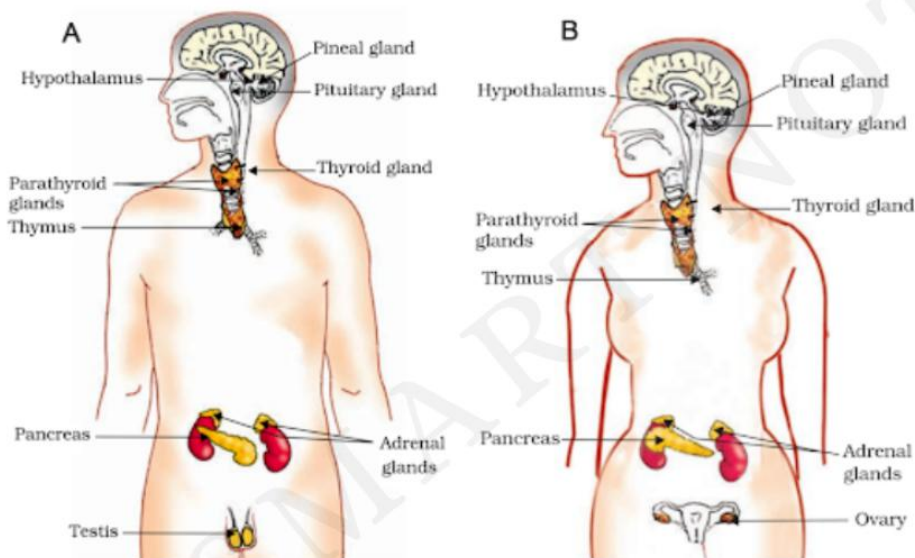
The cerebellum controls coordination, adjustment of movement and posture of our body.

Pons regulates respiration.

The medulla is the centre of involuntary actions like salivation, vomiting, sneezing coughing etc.

61. Draw a neat and labelled diagram of the human hormonal system.

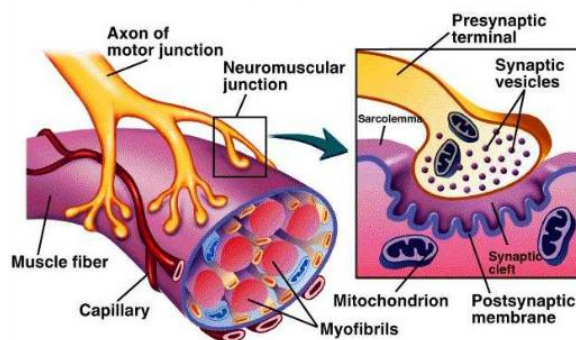
Answer:



62. a) Draw a well-labelled diagram of the neuromuscular junction.

b) Describe the feedback mechanism.

Answer: a)



b) Feedback mechanism: It helps in the secretion of hormones, timing, and regulating the amount of hormones that are released. For eg., if the blood sugar level increases then the immediately pancreas secretes insulin in the required amount to release in the blood and maintain the level of sugar in the blood.

