

**Chapter – 7 Control and Coordination**

**Multiple Choice Question**

**Q1. Which of the following statements is correct about receptors?**

- a) Gustatory receptors detect taste while olfactory receptors detect smell
- b) Both gustatory and olfactory receptors detect smell
- c) Auditory receptors detect smell and olfactory receptors detect taste
- d) Olfactory receptors detect taste and gustatory receptors smell

**Answer:** Option a)

A receptor is a cell or may be a group of cells, in a sense organ which is sensitive to a specific type of stimulus such as light, sound, etc.

**Q2. Electrical impulse travels in a neuron from**

- a) *Dendrite → Axon → Axonal end → Cell body*
- b) *Cell body → Dendrite → Axon → Axonal end*
- c) *Dendrite → Cell body → Axon → Axonal end*
- d) *Axonal end → Axon → Cell body → Dendrite*

**Answer:** Option c)

Neurons carry messages in the form of electrical signals called as nerve impulses. The dendrites pick up the impulses from receptor and pass them to the cell body, along the axon to its axonal end.

**Q3. In a synapse, chemical signal is transmitted from**

- a) Dendrite 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 one neuron to dendrite end of another neuron

**Answer:** Option d)

A minute gap between a pair of neurons on which nerve impulses pass by going from one neuron to other is known as synapse.

**Q4. In a neuron, conversion of electrical signal to a chemical signal occurs at/in**

- a) Cell body

- b) Axonal end
- c) Dendrite end
- d) Axon

**Answer:** Option b)

At axonal end, the nerve impulse releases small number of chemical substances into the synapse. Chemical substance crosses the gap and starts a electrical impulse in the dendrite of next neuron.

**Q5. Which is the correct sequence of the components of a reflex arc**

- a) *Receptors → Muscles → Sensory neuron → Motor neuron → Spinal cord*
- b) *Receptors → Motor neuron → Spinal cord → Sensory neuron → Muscle*
- c) *Receptors → Spinal cord → Sensory neuron → Motor neuron → Muscle*
- d) *Receptors → Sensory neuron → Spinal cord → Motor neuron → Muscle*

**Answer:** Option d)

The nerve impulse takes the pathway in a reflex action is known as reflex arc. A reflex action is an involuntary to a stimulus, example, coughing, sneezing etc.

**Q6. Which if the following statements are true?**

- i) **Sudden action in response to something in the environment is called reflex action**
  - ii) **Sensory neurons carry signals from spinal cord to muscles.**
  - iii) **Motor neurons carry signals from receptors to spinal cord.**
  - iv) **The path through which signals are transmitted from a receptor to a muscle or a gland is called reflex arc.**
- 
- a) i) and ii)
  - b) i) and iii)
  - c) i) and iv)
  - d) i), ii) and iv)

**Answer:** Option c)

Statement ii) and iii) are wrong because, the sensory neurons carry signals from receptors to spinal cord and the motor neurons carry signals from spinal cord to effectors.

**Q7. Which of the following statements are true about the brain?**

- i) **The main thinking part of brain is hind brain.**

- ii) Centres of hearing, smell, memory, sight, etc, are located in fore brain.
- iii) Involuntary actions like salivation, vomiting, blood pressure are controlled by the medulla in the hind brain.
- iv) Cerebellum does not control posture and balance of the body.

- a) i) and ii)
- b) i) ii) and iii)
- c) ii) and iii)
- d) iii) and iv)

**Answer:** Option c)

The cerebrum is the main thinking part of our brain, which coordinates the voluntary actions of the body. There are many areas which performs different functions such as centres of hearing, smell, memory etc.

**Q8. Posture and balance of the body is controlled by**

- a) cerebrum
- b) cerebellum
- c) medulla
- d) pons

**Answer:** Option b)

Cerebellum helps in maintaining the posture and balance of the body.

**Q9. Spinal cord originates from**

- a) cerebrum
- b) medulla
- c) pons
- d) cerebellum

**Answer:** Option b)

Spinal cord starts with medulla.

**Q10. The movement of shoot towards light is**

- a) geotropism
- b) hydrotropism
- c) chemotropism
- d) phototropism

**Answer:** Option d)

A movement of a plant parts in response to an external stimulus, towards or away from it is known as tropism.

**Q11. The main function of abscisic acid in plants is to**

- a) increase the length of cells
- b) promote cell division
- c) inhibit growth
- d) promote growth of stem

**Answer:** Option c)

The main function of abscisic acid in plants is to inhibit growth.

**Q12. Which of the following is not associated with growth of plants?**

- a) Auxin
- b) Gibberellins
- c) Cytokinin
- d) Abscisic acid

**Answer:** Option d)

Abscisic acid is a growth inhibitor hormone. It causes the growth promoting effects of auxins and gibberellins, also it causes dormancy of seeds, wilting of leaves, closing of stomata, etc.

**Q13. Iodine is necessary for the synthesis of which hormone?**

- a) Adrenaline
- b) Thyroxin
- c) Auxin
- d) Insulin

**Answer:** Option b)

Iodine is necessary for the synthesis of thyroxin hormone, deficiency of it in the diet of a person produces less thyroxine hormone and causes a disease called as goitre.

**Q14. Choose the incorrect statement about insulin**

- a) It is produced from pancreas
- b) It regulates growth and development of the body
- c) It regulates blood sugar level

**d) Insufficient secretion of insulin will cause diabetes**

**Answer:** Option b)

Pancreas secretes the hormone insulin and its function is to regulate blood sugar level.

**Q15. Select the mis-matched pair**

- a) Adrenaline-Pituitary gland
- b) Testosterone-Testes
- c) Estrogen-Ovary
- d) Thyroxin-Thyroid gland

**Answer:** Option a)

Adrenaline is secreted by the adrenal glands, located above the kidneys. Growth hormone is secreted by the pituitary gland.

**Q16. The shape of guard cells changes due to change in the**

- a) Protein composition of cells
- b) Temperature of cells
- c) Amount of water in cells
- d) Position of nucleus in the cells

**Answer:** Option c)

Due to amount of water, the shape of the guard cells changes. Since, guard cell swells when water flows into them and guard shrinks because of the loss of water in them.

**Q17. The growth of tendril in pea plants is due to**

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

**Answer:** Option c)

Tendrils are thread like structure that grows on the stem of leaves of the climbing plants. When a tendril touches an object the side in contact with objects grows slowly than its other side, which causes tendril to bend towards the object by growing towards it.

**Q18. The growth of pollen tubes towards ovules is due to**

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

**Answer:** Option b)

The growth in pollen tube towards ovule is induced by a chemical substance secreted by the ripened stigma of flower into the style towards ovary.

**Q19. The movement of sunflower in accordance with the path of sun is due to**

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

**Answer:** Option a)

The movement of plant in response to light is phototropism.

**Q20. The substance that triggers the fall of mature leaves and fruits from plants is due to**

- a) Auxin
- b) Gibberellin
- c) Abscisic acid
- d) Cytokinin

**Answer:** Option c)

Abscisic acid is used for the formation of layer of abscission. This layer disconnects the living tissue of leaf from the other plants.

**Q21. Which of the following statements about transmission of nerve impulse is incorrect?**

- a) Nerve impulse travels from dendritic end towards axonal end
- b) At the dendritic end electrical impulses bring about the release of some chemicals which generate an electrical impulse at the axonal end of another neuron
- c) The chemicals released from the axonal end of one neuron cross the synapse and generate a similar electrical impulse in a dendrite of another neuron
- d) A neuron transmits electrical impulse not only to another neuron but also to muscle and gland cells

**Answer:** Option b)

The information developed at the end of the dendrite of a neuron causes a chemical reaction which creates an electrical impulse, travelling from dendrite to cell body and then along axon.

**Q22. Involuntary actions in the body are controlled by**

- a) Medulla in fore brain
- b) Medulla in mid brain
- c) Medulla in hind brain
- d) Medulla in spinal cord

**Answer:** Option c)

Medulla is a part of hind brain, which controls the involuntary action and regulate reflex responses.

**Q23. Which of the following is not an involuntary action?**

- a) Vomiting
- b) Salivation
- c) Heart beat
- d) Chewing

**Answer:** Option d)

Involuntary actions are that are not under our direct control like heart-beat, breathing, peristaltic movement etc. these all are controlled by medulla. Chewing is under voluntary control which is controlled by lobes present in cerebral cortex.

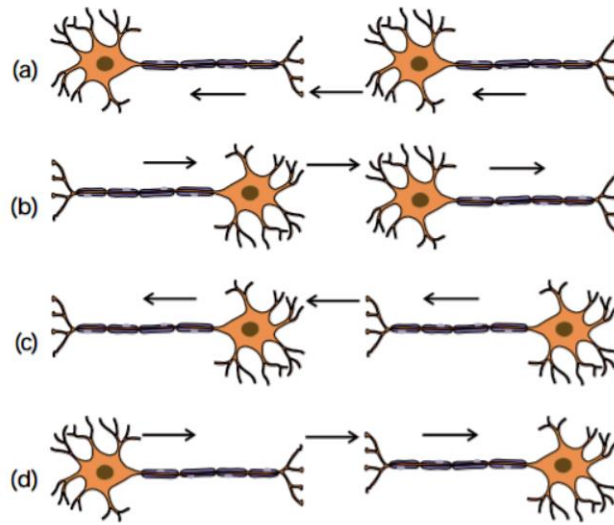
**Q24. When a person is suffering from severe cold, he or she cannot**

- a) Differentiate the taste of an apple from that of an ice cream
- b) Differentiate the smell of a perfume from that of an agarbatti
- c) Differentiate red light from green light
- d) Differentiate a hot object from a cold object

**Answer:** Option b)

Mucus in the nasal passage becomes thick, so that odour molecules cannot reach the olfactory receptor cells. So, brain receives no signal identifying the odour.

**Q25. What is the correct direction of flow of electrical impulses?**



**Answer:** Option c)

Dendrite receives an electrical impulse from the axonal end of another neuron, from where the electrical impulse travels through the cell body, axon and to the axonal end.

**Q26. Which statement is not true about thyroxin?**

- a) Iron is essential for the synthesis of thyroxin
- b) It regulates carbohydrates, protein and fat metabolism in the body
- c) Thyroid gland requires iodine to synthesis thyroxin
- d) Thyroxin is also called thyroid hormone.

**Answer:** Option a)

Iodine is essential for synthesis of thyroxin.

**Q27. Dwarfism results due to**

- a) Excess secretion of thyroxin
- b) Less secretion of growth hormone
- c) Less secretion of adrenaline
- d) Excess secretion of growth hormone

**Answer:** Option b)

Dwarfism is due to deficiency of growth hormone in childhood and excessive secretion causes gigantism.



**Q28. Dramatic changes of body features associated with puberty are mainly because of secretion of**

- a) Oestrogen from testes and testosterone from ovary
- b) Estrogen from adrenal gland and testosterone from pituitary gland
- c) Testosterone from testes and estrogen from ovary
- d) Testosterone from thyroid gland and estrogen from pituitary gland

**Answer:** Option c)

Testes in males, testosterone hormone, control the development of male sex organs and male features that is, changes associated with puberty.

Ovaries in females, oestrogen control the development of female sex organs and female features such as soft skin. Progesterone hormone, controls uterus changes during menstrual cycle.

**Q29. A doctor advised a person to take an injection of insulin because**

- a) His blood pressure was low
- b) His heart was beating slowly
- c) He was suffering from goitre
- d) His sugar level in blood was high

**Answer:** Option d)

A person having high sugar level in blood is called a diabetic. Such person is advised to take less sugar in diet, reduce weight, exercise regularly, also they are treated by taking insulin.

**Q30. The hormone which increases the fertility in males is called**

- a) Oestrogen
- b) Testosterone
- c) Insulin
- d) Growth hormone

**Answer:** Option b)

Testosterone is the male sex hormone which is responsible for secondary sexual character such as moustache, beard etc. hence, increasing male fertility.

**Q31. Which if the following endocrine glands is unpaired?**

- a) Adrenal
- b) Testes
- c) Pituitary

**d) Ovary**

**Answer:** Option c)

Pituitary glands are present below the brain which is unpaired, and it is also called master gland since it secretes number of hormones.

**Q32. Junction between two neurons is called**

- a) Cell junction**
- b) Neuro muscular junction**
- c) Neural junction**
- d) Synapse**

**Answer:** Option d)

Junction between two neurons is called as synapse.

**Q33. In humans, the life processes are controlled and regulated by**

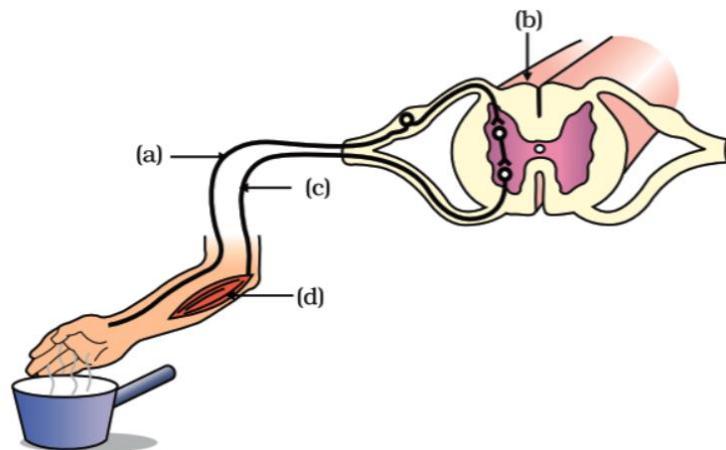
- a) Reproductive and endocrine systems**
- b) Respiratory and nervous systems**
- c) Endocrine and digestive systems**
- d) Nervous and endocrine systems**

**Answer:** Option d)

Nervous system and endocrine system together control and coordinate various activities in human beings.

### **Short Answer Type Questions**

**Q34. Label the parts (a), (b), (c) and (d) and shows the direction of flow of electrical signal in given figure.**



**Answer:**

- (a) Sensory neuron
- (b) Spinal cord
- (c) Motor neuron
- (d) Effector (muscle in arm)

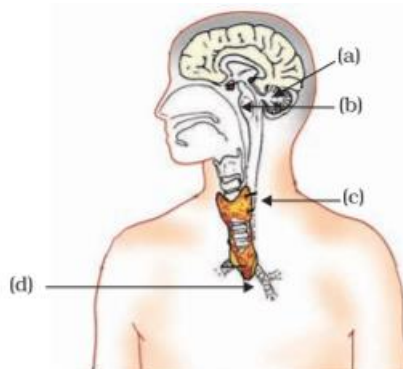
**Q35. Name the plant hormones responsible for the following**

- a) Elongation of cells
- b) Growth of stem
- c) Promotion of cell division
- d) Falling of senescent leaves

**Answer:**

- a) Auxin-elongated of cells
- b) Gibberellin-growth of stem
- c) Cytokine-promotion of cell division
- d) Abscisic acid-falling of senescent leaves

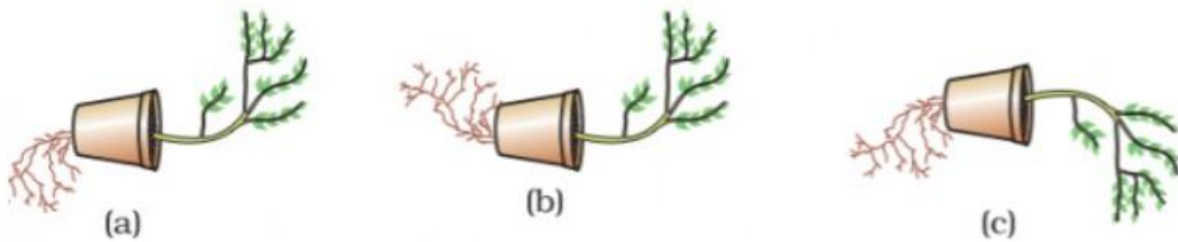
**Q36. Label the endocrine gland in figure**



**Answer:**

- (a) Pineal gland – it is attached to dorsal side of brain
- (b) Pituitary gland – it is located below the brain
- (c) Thyroid gland – it is located to the windpipe
- (d) Thymus – it is located at lower part of the neck and upper part of chest

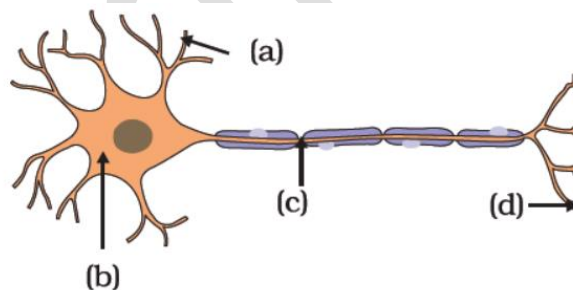
**Q37. In the given figure (a), (b) and (c), which appears more accurate and why?**



**Answer:**

Figure (a) looks more correct, since the roots of a plant always grow downwards in response to gravity in order to make sure they find soil and water.

**Q38. Label the part of a neuron in given Figure.**



**Answer:**

- (a) Dendrite
- (b) Cell body
- (c) Axon
- (d) Nerve ending

**Q39. Match the terms of column I with those of column II.**

Column I	Column II
A. Olfactory receptors	Tongue
B. Thermo receptors (temperature receptors)	Eye

C. Gustatoreceptors	Nose
D. Photoreceptors	Skin

**Answer:**

Column I	Column II
A. Olfactory receptors	Nose
B. Thermo receptors (temperature receptors)	Skin
C. Gustatoreceptors	Tongue
D. Photoreceptors	Eye

**Q40. What is a tropic movement? Explain with an example.**

**Answer:**

Tropic movement is a movement of a plant in the direction of a stimulus or away from it. It is positive if it is directed towards the source of stimulus and considered negative if directed away from the source stimulus.

Example, geotropism, where the tropic response is towards the gravity.

**Q41. What will happen if intake of iodine in our diet is low?**

**Answer:**

The causes of taking low iodine are:

- Release of thyroxin from thyroid gland is less, which affect metabolism of carbohydrate, protein and fat and slow down growth of body.
- A person suffer from goitre.

**Q42. What happens at the synapse between two neurons?**

**Answer:**

When an electrical impulse spread to the end of the axon, it releases a chemical which diffuses across synapse and excites the dendrites of neighbouring neuron.

**Q43. Answer the following**

- Which hormone is responsible for the changes noticed in females at puberty?
- Dwarfism results due to deficiency of which hormone/
- Blood sugar level rises due to deficiency of which hormone?

**d) Iodine is necessary for the synthesis of which hormone?**

**Answer:**

- a) Oestrogen – at the time of puberty in females the ovaries begin to secrete this hormone.
- b) Growth hormone is secreted by the anterior lobe of pituitary, which help in growth and development of body.
- c) Insulin – it controls the rate of oxidation of glucose, helps liver and muscles to absorb glucose from the blood.
- d) Thyroxine – secreted by thyroid gland, which regulates the carbohydrate, protein and fat metabolism in the body.

**Q44. 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?**

**Answer:**

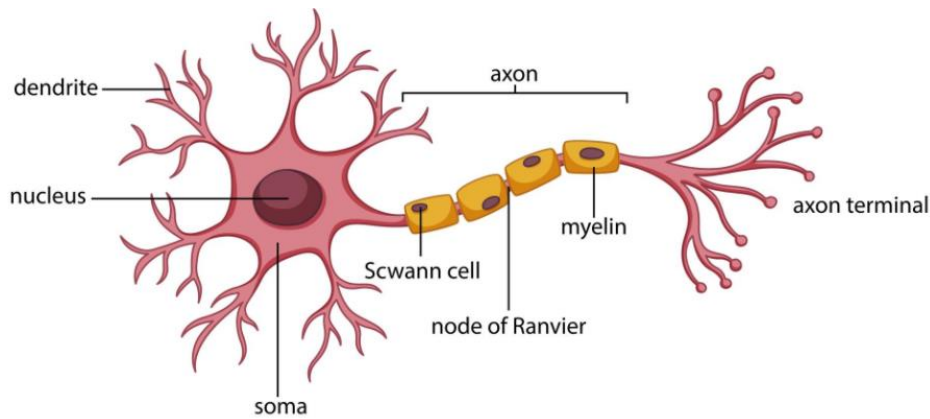
- a) Pituitary – Hypothalamus gland which resides in brain releases hormones that regulate the secretion of pituitary glands.
- b) Pancreas – it's a digestive gland also it secretes pancreatic juice for digestion of food. It also, secretes hormones as insulin.
- c) Adrenal – Adrenal glands are present on the top of two kidneys.
- d) Testes – these glands are present only in males and it secretes male sex hormone, testosterone.

### **Long Answer Type Question**

**Q45. Draw the structure of a neuron and explain its function.**

**Answer:**

Neuron, also called as nerve cells unit which make up the nervous systems. These are structural and functional unit of nervous system; it is also the largest cell in the body. It also, carries messages in the form of electrical signals over large distance in the body.



A neuron has 3 components:

- i) Cell body – has cytoplasm and a nucleus.
- ii) Dendrites – they are shorter fibres on the body of a neuron.
- iii) Axon – the longest fibre on cell body of a neuron.

**Q46. What are the major parts of the brain? Mention the function of different parts.**

**Answer:**

Brain has 3 major parts:

1. Fore-brain
2. Mid-brain
3. Hind-brain

Fore brain – the major parts of fore-brain are:

- i) Cerebrum – it is the main thinking part of the brain
- ii) Cerebral hemispheres – intelligence and voluntary actions
- iii) Olfactory lobes – it is the centre of smell
- iv) Diencephalon – it has centre of hunger, thirst etc.
- v) Motor areas – it instructs muscles to do various types of jobs.

Mid-brain – the major parts of mid-brain are:

- i) Tectum – controls reflex movements of the neck, head and trunk in response to visual and auditory stimuli.
- ii) Cerebral peduncle – it controls the reflex movements of the eye muscles, changes the pupil size and shape of the eye lens.

Hind-brain – the major parts of hind-brain are:

- i) Pons controls respiration and Transmits information between the cerebellum and the cerebrum.
- ii) Cerebellum maintains the posture balance of the body. Also, it enables us to make a precise and accurate movement.
- iii) Medulla controls involuntary actions such as breathing etc. it also controls centre for reflexes such as swallowing, coughing, vomiting etc.

**Q47. What constitutes the central and peripheral nervous system? How are the components of central nervous system protected?**

**Answer:**

The central nervous system consists of:

- i) Brain is coordinating centre in the body, lodged in the brain box or cranium, protecting it and covered by membranes called meninges. The space between membranes and the brain is filled with a cerebrospinal fluid which protect the brain from mechanical shock.
- ii) Spinal cord is a long cylindrical structure, which initiates from the medulla oblongata and spreads downwards and surrounded by a bony cage called Vertebral column, which protects it. It is surrounded by meninges, which is concerned with spinal reflex actions and conduction of nerve impulses to and from the brain.

Peripheral Nervous Systems (PNS)

- i) Cranial nerves – they are 12 pairs that emerge from the brain.
- ii) Spinal nerves – it has 31 pairs that arise from the spinal cord and spread throughout the body.
- iii) Visceral nerves – they arise from spinal cord and are connected to the internal organs of the body. They both carry sensory and motor neurons.

**Q48. Mention one function for each of these hormones**

- a) Thyroxin
- b) Insulin
- c) Adrenaline
- d) Growth hormone
- e) Testosterone

**Answer:**

Hormone	Function
a) Thyroxin	It controls carbohydrate, protein and fat metabolize to provide balance for



	growth.
b) Insulin	It helps in regulating blood sugar levels.
c) Adrenaline	Increases heart rate and supply blood .
d) Growth hormone	It controls growth and development in the body.
e) Testosterone	Controls the changes of puberty in male.

**Q49. Name various plant hormones. Also give their physiological effects on plant growth and development.**

**Answer:**

<b>Plant hormone</b>	<b>Physiological effect</b>
a) Auxin	Synthesised in the younger tip of roots and shoots. Promotes cell elongation and division. Plays important role in formation of root and seedless fruit
b) Gibberellin	Help in growth of stem and flower Help in germination of seed
c) Cytokinin	Promote cell division , prevent leaf ageing and leaf expansion
d) Abscisic acid	Growth inhibitor. Converts the growth of auxins and gibberellins.
e) Ethylene	Promotes growth, fruit ripening, promotes senescence and abscission of leaves.

**Q50. What are reflex actions? Give two examples. Explain a reflex arc.**

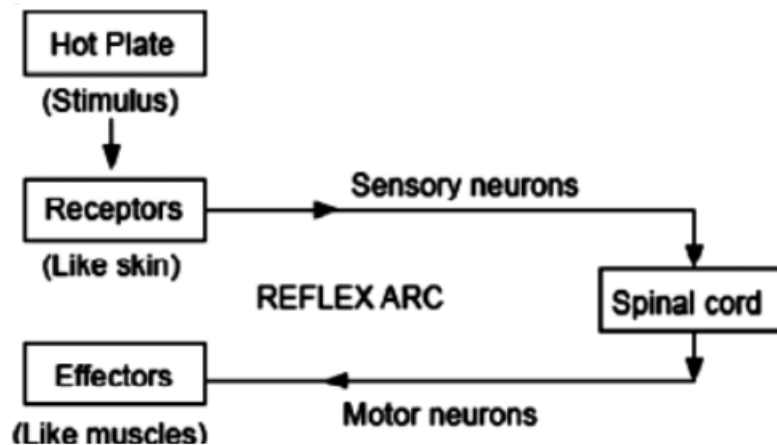
**Answer:**

Reflex action is an involuntary response to a stimulus and not under control of the brain. In a simple form of behaviour in which the same stimulus produces the same response every time.

Example:

- i) On touching a hot plate, we move our hand away from it.
- ii) Moving our foot away on stepping something sharp

The pathway taken by impulse in a reflex action is known as reflex arc.



Reflex arc have evolved in animals since the thinking process of brain is not fast enough.

**Q51. Nervous and hormonal systems together perform the function of control and coordination in human beings. Justify the statement.**

**Answer:**

Control and coordination of a human is influenced by nervous system. Brain controls all the organelles and organ system. The overall control is done by the network of neurons since they carry message signals through neurotransmitters to and from the brain.

Hormonal system consists of varieties of hormones secreted by various glands in our body. Hormonal system coordinates the function of nervous system. They produce hormones when required and can stop production when not required.

**Q52. How does chemical coordination take place in animals?**

**Answer:**

Chemical coordination in animals takes place by performing hormones that are chemical messengers. Different endocrine glands secrete different hormones to regulate various processes.

Hormones released in blood which carry them to specific tissues or organs are called target tissues/organs. In case of target tissue, hormone triggers a particular biochemical or physiological activity.

**Q53. Why is the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron but not the reverse?**

**Answer:**

The synapse acts as one-way valve because the chemical substance is present only on one side of the gap. This chemical distributes towards the dendrite end of next neuron and generates an electrical signal.

The chemical is absent at the dendrite end of the neuron, the nerve impulse can go across only from one side. In this manner, it is ensured that nerve impulse travel in only one direction.

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