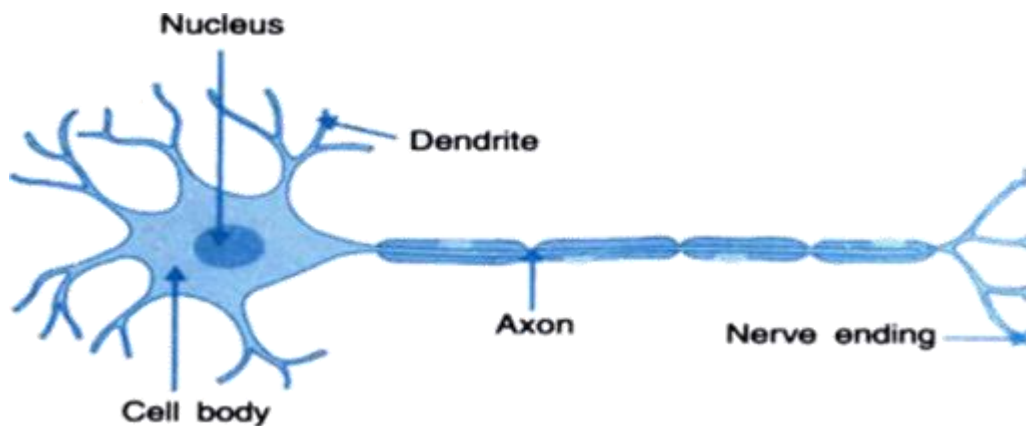


Control And Coordination

Check Point 01

Q. 1. Name the structural and functional unit of nervous system.

Answer: Neurons are the structural and functional unit of human nervous system. Parts of neuron are dendrite, nucleus, cell body, axon and nerve ending. All the information is received from dendrites and through nerve ending is passed to the next neuron.



Q. 2. What is detected by gustatory receptors?

Answer: Gustatory receptors detect the taste. They are distributed over the surface of the tongue in individual organs called taste buds. Like olfactory receptors will detect smell.

Q. 3. At which point information is acquired in the neuron?

Answer: At the end of the dendritic tip information is acquired. After the information is acquired, chemical reaction is set off at the dendritic tip and an electrical impulse is generated. This impulse is passed through axon to its end. At axon end, impulse is set off and again some chemicals are released, which crosses the gap between the two nerve cells and again starts the same procedure in the second nerve cell.

Q. 4. Define reflex action.

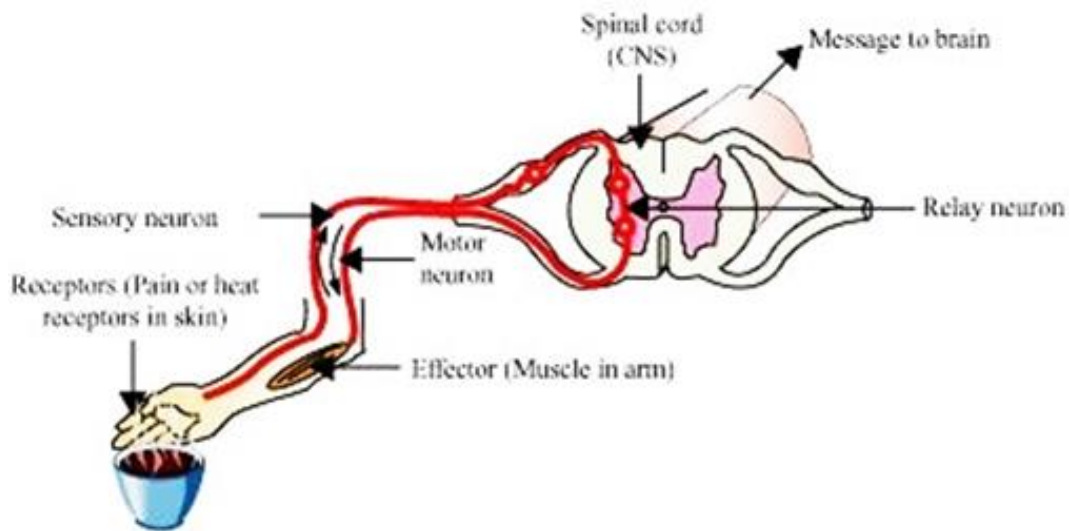
Answer: A reflex action or also known as reflex is the sudden action given in response to any activity. These are the involuntary movement. Reflex action does not involve the conscious part of the brain. The path of impulses in reflex action is known as reflex arc. For example when we touch the hot pan by mistake we suddenly pull-off our hands. This response to the stimuli is known as reflex action.

Q. 5. Give two examples of reflexes.

Answer: Examples: - 1. On touching a hot pan we pull-off our hand.
2. Contraction of pupil when there is bright light.

Q. 6. What is the role of sensory neuron in a reflex arc?

Answer: Components of reflex arc are receptors, sensory neuron, spinal cord (CNS), relay neuron, motor neuron and effector. The basic function of sensory neuron is to carry the impulse from sensory organ to the central nervous system. For example when we touch a hot pan the from the receptors present on our hands the stimulus is passed to spinal cord or central nervous system through the sensory neuron.



Check Point 02

Q. 1. What constitutes Central Nervous System (CNS)?

Answer: Spinal cord and brain together make the central nervous system. All the sensory and motor impulses are sent to and from the brain through the spinal cord and also spinal cord is centre for all the reflex actions. Brain the major centre of co-ordination in the body.

Q. 2. What is the role of the Peripheral Nervous System (PNS)?

Answer: Peripheral Nervous System consists of cranial nerves from the brain and spinal nerves from the spinal cord. All these nerves lie outside the spinal cord and brain. The main function of PNS is to build a communication channel between central nervous system and the other parts of the body is facilitated by peripheral nervous system.

Q. 3. Mention the part of the brain involved in thinking. State one more function of this part.

Answer: The Human brain has three parts- fore-brain, mid-brain, and hind-brain. Fore-brain is the main part which is involved in thinking. It has all the sensory receptors so it receives all the sensory impulses. Different parts of fore-brain are responsible for hearing, seeing etc.

Q. 4. Which part of the brain helps us to focus on the objects?

Answer: Fore-brain helps us to focus on the objects. In fore-brain occipital lobe is responsible for processing the sight.

Q. 5. Blood pressure and heart rate will be regulated by which part of the brain?

Answer: Hind part Medulla oblongata is responsible for the control of involuntary activities such as breathing, blood pressure (BP) etc.

Q. 6. Name the structure that helps in the protection of the spinal cord.

Answer: Spinal cord is protected by the vertebral column, also known as the backbone. It is a hard and bumpy structure which protects the spinal cord.

Q. 7. Why do muscles change their shape in response to a nerve impulse?

Answer: In order to cause the movement of muscles, muscles change their shapes and arrangement in cell in response to nervous impulse. The new arrangement of proteins thereby, give the muscle cells a shorter form and move in direction according to the mind.

Check Point 03

Q. 1. Plants do not have any nervous or muscle tissue, still, they have the ability to sense touch. How?

Answer: In plants also electrical-chemical means is used to convey the information of touch from the cells to cells. By changing the amount of water they change the shape of the plant cell and hence information about touch is transferred. This movement is known as growth independent movement and this is seen in the touch-me-not plant.

Q. 2. Plants show tropism in response to stimuli'. Comment.

Answer: Tropism means movement of the part of the plant either in the direction of the stimuli or away from the stimuli. Stimuli can be light, gravity, water or chemicals. For example, in case of phototropism means movement of part of the plant in the presence of light, in this two type of movement is seen shoots moves or grows in the direction of

light whereas in case of roots, it grows in the direction opposite to the light. So, with different stimulus plants show different tropism or directional movement.

Q. 3. What is common in plants like pea, pumpkin, and cucumber?

Answer: They all show the growth of tendrils which are sensitive to touch. When tendrils come in contact with the support, the part which is not in contact with the support tends to grow fast and tendrils circles around the object or the support and clings over the object.

Q. 4. Identify the stimulus in the following movements:

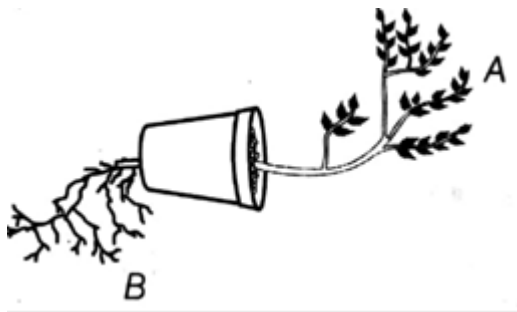
- (i) Phototropism
- (ii) Geotropism
- (iii) Chemotropism

Answer: (i) 'Photo' means light so, in phototropism light acts as the stimulus.

(ii) 'Geo' means earth or gravity so, in geotropism earth or gravity acts as the stimulus.

(iii) 'Chemo' means chemicals so, in chemotropism chemicals acts as the stimulus.

Q. 5. Observe the given figure. Identify A and B types of tropism shown by the plant.



Answer: In the given diagram, the plant is showing geotropism that is a movement of the part of the plant either in the direction of gravity or away from gravity. A shows negative geotropism or shoots are negatively geotropic as it grows away from the earth or in the opposite direction of the gravity. B shows positive geotropism or roots are positively geotropic as it grows in the direction of gravity or the earth.

Q. 6. Give an example of chemotropic movement.

Answer: Chemotropic movement means movement in the direction of the chemicals. For example, growth of pollen tube towards the ovule during fertilisation.

Check Point 04

Q. 1. Why is there a need for chemical communication in organisms?

Answer: In an organism cells cannot continuously create and transmit electrical impulses. Thus most multicellular organism use another means of communication between different cells, called the chemical communication.

In this A chemical compound is released, which would diffuse all over around the original cells. Other, cell around will detect the compound using special molecules. They can recognize and transmit the information carried by it. These compounds are called hormones.

Q. 2. How auxin helps in the bending of shoots towards a light source?

Answer: In the presence of light auxin is released or is synthesized at the tip of the shoot which helps the cells to grow. When the light comes from one side, auxin diffuse towards the shady part of the shoot. This concentration of auxin elongates the cells of the shady part of the shoot and hence it appears that the plant is bending towards the light.

Q. 3. The highest concentration of cytokinin is found in which area?

Answer: Cytokinin are the hormones which promote cell division.

Highest concentration of cytokinin is found in the areas of rapid cell division like fruits and seeds.

Q. 4. Which plant hormone is a growth inhibitor?

Answer: Abscisic acid is the growth inhibitor hormone that is it stops the growth of the plant. Because of this hormone wilting of leaves is seen.

Q. 5. How does adrenaline prepare us for the stress situations?

Answer: In stress situations adrenaline is released into the blood by adrenal glands. Its target organ is heart which as results heart rates increases so as to increase the supply of the oxygen to the muscles, blood to digestive system and skin is reduced and breathing rate increases. All these responses together prepare the body to face any stressful situation.

Q. 6. What will happen if the intake of iodine in our diet is low?

Answer: If there is iodine deficiency then production of thyroxin stops and as a result, the neck swells and this condition is known as goitre. Iodine is very important for the production of thyroxine hormone.

Q. 7. What is the significance of the feedback mechanism in the control of hormonal secretions?

Answer: Feedback mechanism makes sure that the desired amount of hormones is released. Also, it makes sure that the timing and amount of the hormones are correct. For example in the sugar level increases in the blood, insulin is secreted which decreases the amount of sugar in the blood. As the amount of sugar falls, insulin also gets reduced.

Chapter Exercise

Q. 1. Is reflex action the only function of the spinal cord. Support your answer with a single statement.

Answer: No reflex action is not only function of spinal cord; it is function of central nervous system which consists of spinal cord and brain.

Q. 2. The sensation of feeling fear of hunger is associated with which part of the brain?

Answer: Fore-brain is associated with the feeling of hunger. In fore-brain hypothalamus is responsible for this feeling.

Q. 3. Give the exact location and function of the cerebellum.

Answer: Cerebellum is located in hind-brain and is responsible for maintaining the balance and posture of the body.

Q. 4. How is geotropism necessary for the plant?

Answer: Geotropism is necessary for proper growth and orientation of a plant. It is because of geotropism that root and shoot growth in their respective directions.

Q. 5. Write one function of each

A. Auxin

B. Gibberellins

Answer: A. Auxin is a growth hormone and is responsible for cell elongation.

B. Gibberellins help in stem growth, seed germination and flowering.

Q. 6. Name the source and target organ of adrenaline.

Answer: Adrenaline is secreted by adrenal glands directly into the blood.

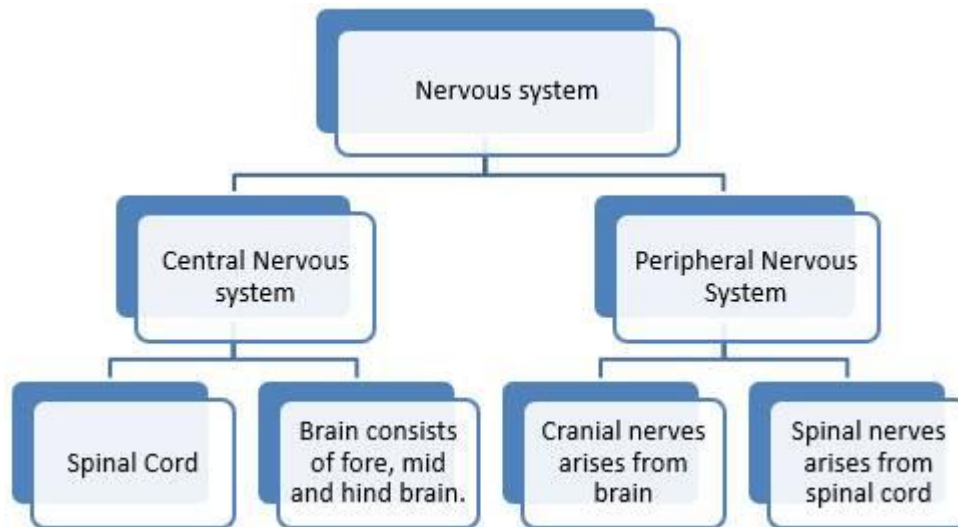
The target organ is Heart.

Q. 7. Neuron is the longest cell but does not undergo cell division. Why is it so?

Answer: Centriole is responsible for carrying out cell division but in neurons, centrioles are absent so they do not divide. Another reason why neurons don't divide is that they are linked with a brain so each time it will become difficult for the brain to reset the memory. That is why neurons do not divide.

Q. 8. Give the flow chart of the nervous system of the human beings.

Answer:



Q. 9. If the effectors are missing in the reflex arc, what will happen?

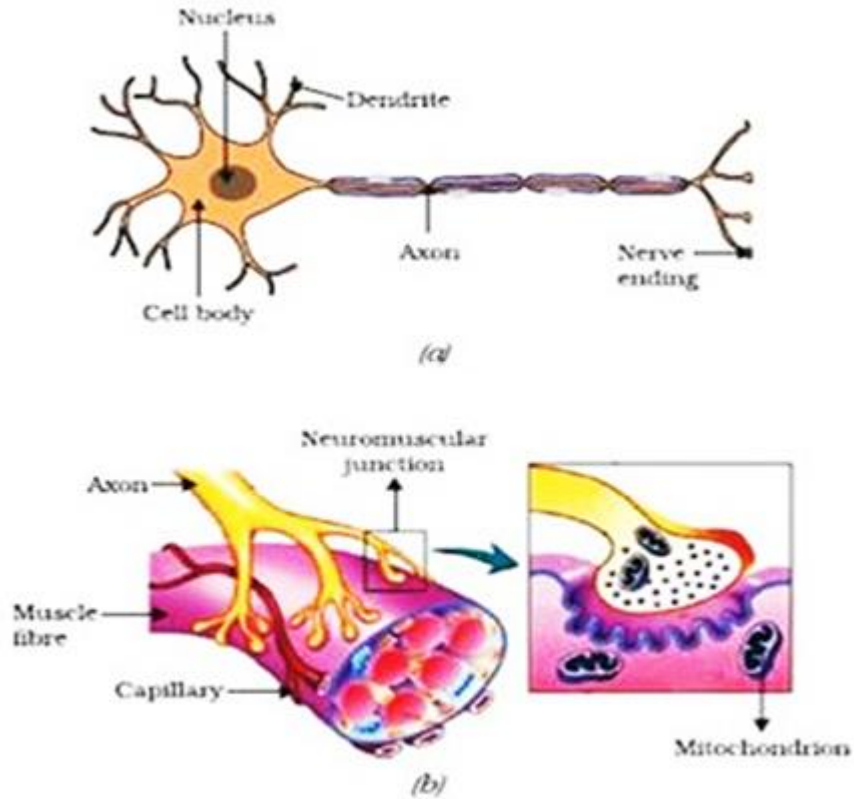
Answer: Effectors are nothing but the muscles itself. If it is absent then the movement of the hand after receiving the signal won't be possible since there is no organ to act upon the electric impulse. For example, in case we touch hot pan then in the absence of effectors, we won't be able to pull back our hand.

Q. 10. Draw a neat and well-labelled diagram of the neuromuscular junction.

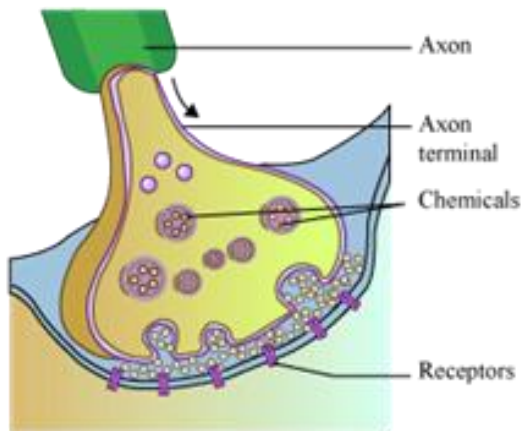
OR

Draw a schematic diagram of transmission of a nerve impulse at neuromuscular junction.

Answer:



OR



Q. 11. How are the occipital lobe and the olfactory lobe of the forebrain differ from each other?

Answer: Occipital lobe of the fore-brain is for sight whereas olfactory lobe is for sense of smell.

Q. 12. Midbrain connects the forebrain and hindbrain. Write its role in CNS.

Answer: Midbrain connects forebrain to the hindbrain. It controls the movement of the head, neck and trunk to locate sounds and visual reflexes that are involved in focusing on the objects.

It controls reflex that are involved in movement of eye muscles, pupil size etc.

Q. 13. Write the type of response that occurs when an organism eats food.

Answer: When we put food in our mouth that response is a voluntary response and after that, the process of digestion and excretion comes under the involuntary response.

Q. 14. 'Tropism is directional whereas nastic movement is non-directional'. Justify this statement.

Answer: Tropism is the movement in the presence of any stimulus. If the movement is towards the stimulus then it called positive tropism and if the movement is away from the stimulus then it is called negative tropism.

In nastic movement, there is not directional movement in the presence of stimuli. These movement always occur in the particular direction irrespective of the type of stimuli.

Q. 15. Do organisms have hormones, who control their directional growth? Justify.

Answer: Plants have auxin which is synthesized at the tip of the shoot and it is responsible for the directional growth of the shoot towards the light. In the presence of light auxin is released or is synthesized at the tip of the shoot which helps the cells to grow. When the light comes from one side, auxin diffuse towards the shady part of the shoot. This concentration of auxin elongates the cells of the shady part of the shoot and hence it appears that the plant is bending towards the light.

Q. 16. 'Pancreas' is the overall controller of the blood glucose level. Give your views.

Answer: Pancreas produce insulin which helps in maintaining the blood glucose level in the body. When glucose level increases pancreas produced insulin which makes sure that cells take up glucose from the blood. Soon blood glucose level starts to drop and as it decreases the production of insulin also decreases.

Q. 17. 'There is a close coordination between nerves and hormones'. Explain in brief.

Answer: Hypothalamus is part of hind-brain. So it becomes the part of CNS and is responsible for maintaining the homeostasis of the body. Also, it is responsible for secreting the hormones in the human body. So because of the hypothalamus there is close coordination between nerves and hormones. Also when adrenaline is released

into the blood supply of oxygen increases to the muscle which helps to run and is made of nerves. So nerves and hormones together work in case of stress.

Q. 18. What are receptors with reference to the nervous system? List three types of receptors and mention their functions. How do receptors pass the information to the brain?

Answer: Receptors are tissues which are capable of receiving any stimuli and start the impulse which is passed to the CNS.

Three types of receptors are: -

1. Olfactory receptor: - They detect the smell
2. Gustavo receptor: - They detect the taste
3. Thermoreceptor: - they detect the temperature of the outer world.

Receptor through sensory-motor passes the information to the spinal cord which then sends the information to the brain.

Q. 19. Following are the two examples of plant movement.



(a) *Mimosa* plant



(b) Pea plant

(i) Which stimulus is common for movement in both the cases?

(ii) Does the movement take place towards the point where the stimulus is received? Mention separately for both plants.

(iii) Give one reason for the movement in each case.

Answer: (i) In both the cases stimulus of touch is same.

(ii) In the mimosa plant, the movements of leaves are in the opposite direction to the touch. On touching the leaves, they curl up towards the stem.

This is because plant cell change, their shape by changing the amount of the water in them. This happens due to swelling or shrinking of cell.

In case of the pea, plant tendrils cling over the object or the support so the movement takes place in the direction of the stimulus.

(iii) In mimosa plant, this movement is seen because of the change in concentration of water in the leaves.

In pea plant, this movement is seen because of the rapid growth of that part of a tendril which is away from the stimulus or the support.

Q. 20. A plant in the laboratory is given an increased dose of a hormone, which promotes the development of seedless fruits. Identify the hormone and write its other two functions.

Answer: Auxin is given in an increased dose which promotes the development of seedless fruits. Other functions of auxin are: it is responsible for elongation of cells at the shoot tip and also is responsible for showing positive phototropism.

Q. 21. A boy runs on seeing a stray dog. His breathing rate becomes very fast and blood pressure also increases.

(i) Name the hormone found to be high in his blood and the gland which produces it.

(ii) What other effects are caused by this hormone?

Answer: (i) In this case adrenaline hormone will be highest in the blood. It is produced by the adrenal gland.

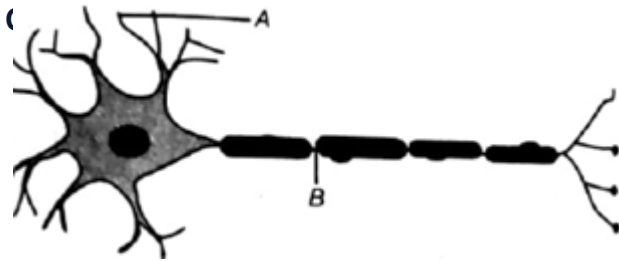
(ii) Supply of blood to digestive system and skin is reduced, supply of oxygen increased towards the muscles and also the blood supply to the heart is increased.

Q. 22. Adrenal glands are located on top of each kidney. What will happen if these glands do not secrete adrenaline?

Answer: If these glands do not secrete adrenaline then our body won't get prepared for stressful situations. Also, there are many disorders like Addison's disorder which a person might have to face such disorders.

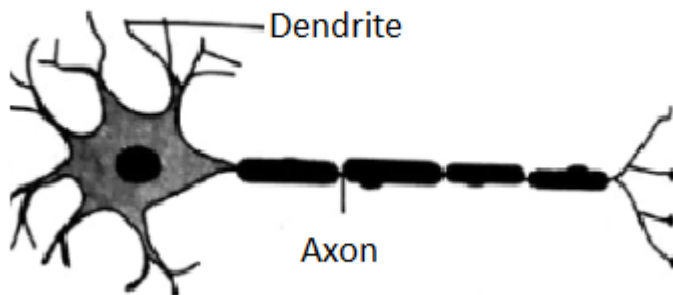
Q. 23. The feedback mechanism is an important aspect of hormonal coordination. Explain.

Answer: Yes feedback mechanism is a very important aspect of hormonal co-ordination as it is responsible for making sure that the desired amount of hormones is released. Also, it makes sure that the timing and amount of the hormones are correct. For example in the sugar level increases in the blood, insulin is secreted which decreases the amount of sugar in the blood. As the amount of sugar falls, insulin also gets reduced.



- (i) Name the parts labelled as A and B in the diagram given above.
- (ii) Which part acquires the information in the neuron?
- (iii) Through which part does the information travel?
- (iv) In what form does the information travel?
- (v) Where is the impulse converted into a chemical signal for onward transmission?

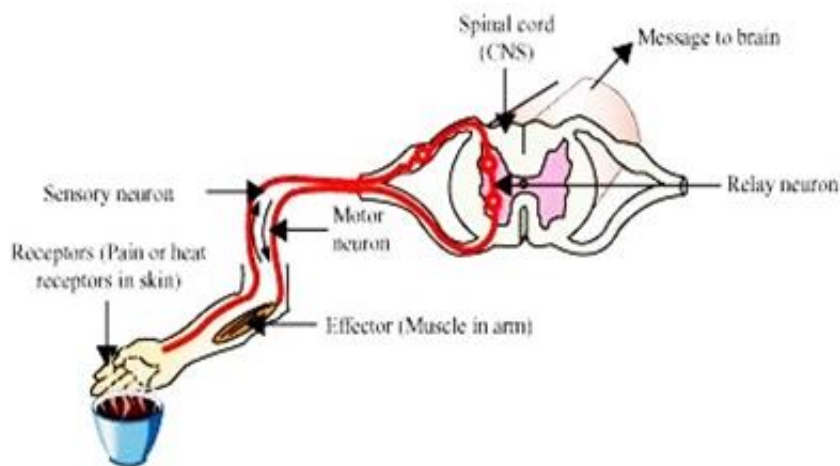
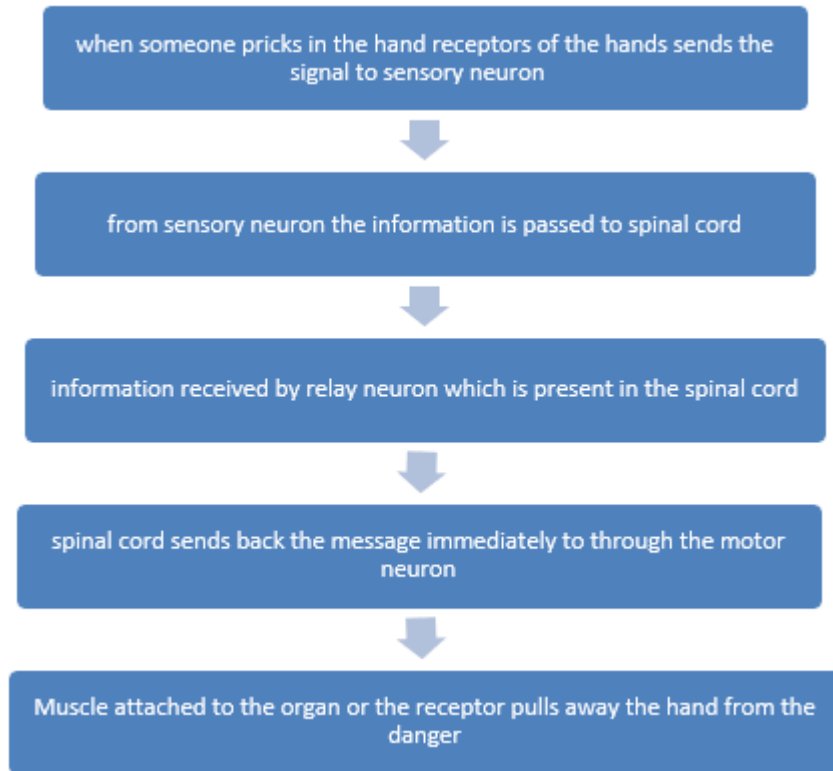
Answer:



- (i) A is dendrite and B is axon.
- (ii) Part A that is dendrite acquires the information in the neuron.
- (iii) Through part B that is axon the information travels.
- (iv) The information travels in the electrical impulse.
- (v) At the nerve ending the impulse is converted into a chemical signal.

Q. 25. With the help of a labelled diagram, illustrate the pathway of response when someone pricks in your hand with a pin.

Answer:

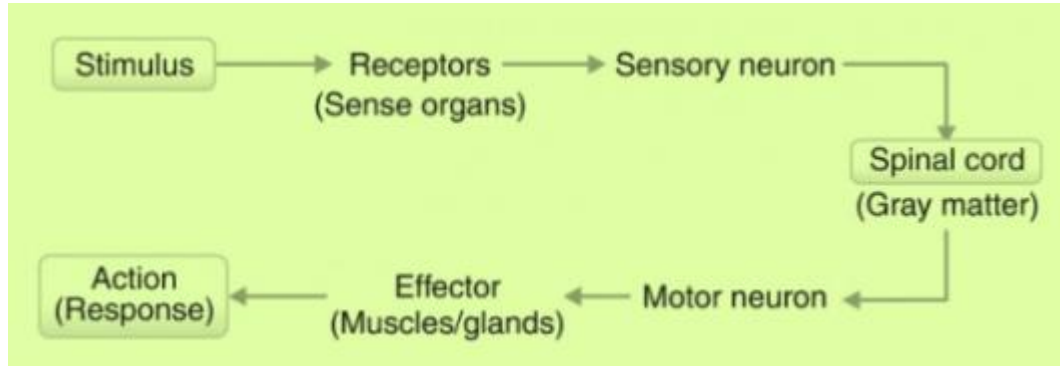


Q. 26. (i) A nerve input signal travelled only up to the spinal cord and gave output signal for a response. What type of action did the body show-voluntary or involuntary?

(ii) Draw a nerve pathway for the above action and suggest specific terms for input nerve and output nerve.

Answer: (i) When a nerve input signal travelled only up to the spinal cord and gave output signal for a response, then such type of action is called an involuntary action. An involuntary action occurs without the conscience of the organism.

(ii) The nerve pathway is shown below:



Q. 27. Nerves and hormones both are used to control processes within the body. Using examples, show how nervous control and hormonal control.

- (i) resemble and
 (ii) differ from one another.

Answer: (i) Hypothalamus is part of hind-brain. So it becomes the part of CNS and is responsible for maintaining the homeostasis of the body. Also, it is responsible for secreting the hormones in the human body. So because of the hypothalamus there is close coordination between nerves and hormones. Also when adrenaline is released into the blood supply of oxygen increases to the muscle which helps to run and is made of nerves. So nerves and hormones together work in case of stress.

(ii) Differences: -

Nervous control	Hormonal control
<ul style="list-style-type: none"> • Mode of communication is electrical 	<ul style="list-style-type: none"> • Mode of communication is chemical.
<ul style="list-style-type: none"> • Fast 	<ul style="list-style-type: none"> • Slow
<ul style="list-style-type: none"> • Can reach cells on those which are connected by nerves 	<ul style="list-style-type: none"> • Can travel in the full body and reach all the parts of the body.

Q. 28. (i) Suggest an explanation for the fact that the chemicals produced by endocrine glands are usually in the form of small molecules.

(ii) Write any three endocrine glands and chemically produced by them.

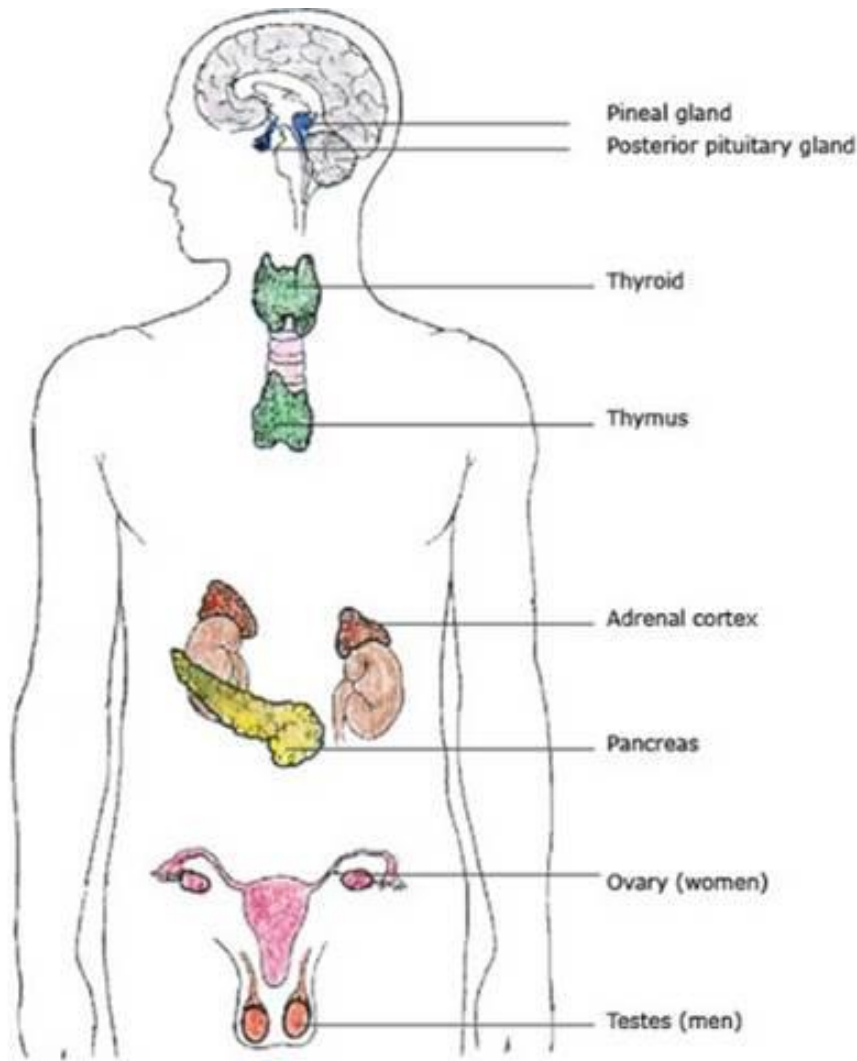
Answer: (i) The endocrine system is a control system of ductless glands that secrete hormones directly through blood. Thus, a smaller size helps in easy diffusion through the blood. Moreover, the endocrine molecules are basically responsible for chemical

communication in an organism. These glands secrete special small molecules which needs to be diffused with cells of target organs to detect them with special molecules. Thus, to make the process of diffusion faster in the target organ cells. Hence these hormones consists of small molecules.

(ii) The three endocrine glands and the chemicals they produce are:

1. Pineal gland - It produces melatonin. It is the hormone that affects the sleeping patterns.
2. Thyroid – This gland produces hormones which regulate the heart rate, the rate of metabolism and affect the growth.
3. Pituitary gland – The most important gland, that produces more than 9 hormones – example - thyroid stimulating hormone (TSH).

The organs of endocrine glands are shown here:



Organs of the Endocrine System

Q. 29. An endocrine gland P is located below the stomach in the human body. The gland P secretes a hormone H. The deficiency of hormone H in the body leads to a rise in blood sugar, due to which a disease D is caused.

Answer: P is pancreas. H is insulin. D is diabetes or high blood sugar level.

Q. 30. Ramesh a class X student, goes with his mother to bring milk from a nearby dairy farm. On a number of occasions, he had seen the dairy owner giving an injection to the buffalo before milking. Ramesh being concerned discussed with the dairy owner, about the harmful effects of such practice. Read the above passage and answer the following questions.

(i) Which chemical was being injected by dairy owner in buffalo before milking it and why?

(ii) What other major functions this chemical performs in buffalo or adult human

females? Also, list two common terms used for the chemical based on its functions.

(iii) Why should such practice be discouraged? Comment.

(iv) What values were shown by Ramesh?

Answer: (i) Progesterone was being injected in buffalo to increase the milk production.

(ii) Progesterone is responsible maintain the menstrual cycle in the women. Milk-producing and sex hormone.

(iii) This practice should be discouraged as it may affect the buffalo as well as the quality of milk which can have an adverse effect on us.

(iv) Responsible, good knowledge skills and aware.

Q. 31. Recently. The science teacher discussed with students ‘Control and Coordination in Animals’. He told children that two systems, i.e. the nervous system and endocrine system help to regulate all body functions. He also told becoming addict to alcohol drinking and how alcohol is affecting their body.

Read the above passage and answer the following questions.

(i) Which hormones are responsible for the onset of adolescence

(ii) How does alcohol drinking affect the nervous system?

(iii) What role the government should play to check alcohol drinking especially by adolescents? Give at least two suggestions.

(iv) What values were shown by the teacher?

Answer: (i) Hormones like testosterone and estrogen are responsible for the onset of adolescence.

(ii) Alcohol acts as a depressant and it slows down the working of the nerves cell and also the activity of CNS.

(iii) A. The government should make sure that all the liquor shops should not give drinks without checking the id card.

B. Should run awareness campaigns.

(iv) Responsible, knowledgeable and concerned.

Q. 32. In order for quick harvest, a farmer added product A in the field. Later, the effects of another product were observed, i.e. wilting of leaves and dormancy in seeds. Read the above passage and answer the following questions.

- (i) What is the name of product A? List its two functions.
- (ii) Can you guess what was applied instead of product A? What is its mode of action?
- (iii) Can you suggest two naturally occurring plant hormones and their actions?
- (iv) What values should be present in agricultural practitioners?

Answer: (i) Abscisic acid is product A. Its functions are cell division (in fruits and seeds) and breaking of seed dormancy.

(ii) Abscisic acid. It inhibits the growth.

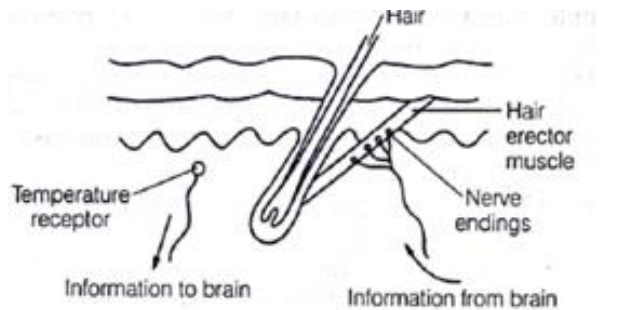
(iii) Auxin – elongation of cells and promotes the growth of seedless fruits.

Gibberellins – stem growth, seed germination and flowering.

(iv) Values like honesty and responsibility should be present in agricultural practitioners.

Challengers

Q. 1. The given diagrams shown some of the features of human skin.

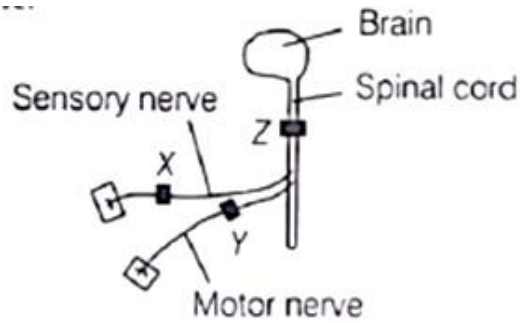


Which part of the brain coordinates the information labeled in the diagram?

- A. Medulla
- B. Hypothalamus
- C. Cerebrum
- D. Cerebellum

Answer: In this both nerves and hormonal function is involved so the only part which handles the both is hypothalamus.

Q. 2. The diagram shows the central nervous system, which has been blocked in three different places by a drug used as an anaesthetic.

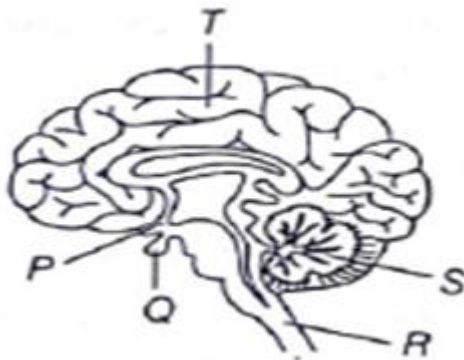


Three men had one anaesthetic block at X, Y or Z. One of the men can move his leg in response to a pinprick, but does not feel it. Where is the anaesthetic block in this man?

- A. At x
- B. At y
- C. At Z
- D. No block

Answer: At Z because the message does not reach the brain cells and as a result the man cannot feel it.

Q. 3. Observe the figure given below. In the figure, some parts are labeled as P, Q, R, S and T. Given below are functions associated with these parts.



Parts of brain	Functions
P	Master hormone producers
Q	Controls body temperature
R	Controls unconscious activities
S	Helps to control balance
T	In conscious behaviour

Which part of the brain is matched with incorrect function?

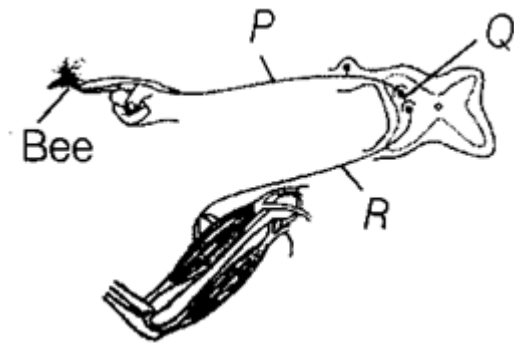
- A. p and S**
- B. P, Q and T**
- C. R and T**
- D. P, R and T**

Answer: Function of P – Master hormone

Function of Q – Q is pituitary gland and it is responsible for secreting hormones.

Function of T – Centre of conscious behavior

Q. 4. The diagram shows a reflex arc in which a bee sting causes the arm to be moved quickly?



If the relay neuron is damaged, how will the transmission of nerve impulses in the reflex arc be affected?

- A. Impulses cannot pass from p- Q**
- B. Impulses cannot pass from p- R**
- C. Impulses cannot pass from Q- P**
- D. Impulses cannot pass from R- Q**

Answer: If relay neuron is damaged, the impulse cannot pass from R-Q

Q. 5. Adrenaline hormone is secreted in the body during emergency situations. What would be the effects of increased concentration of adrenaline on body?

	<i>Concentration of glycogen in the liver</i>	<i>Concentration of glucose in the blood</i>
(a)	Decrease	Increase
(b)	Increase	Increase
(c)	No effect	Decrease
(d)	Increase	No effect

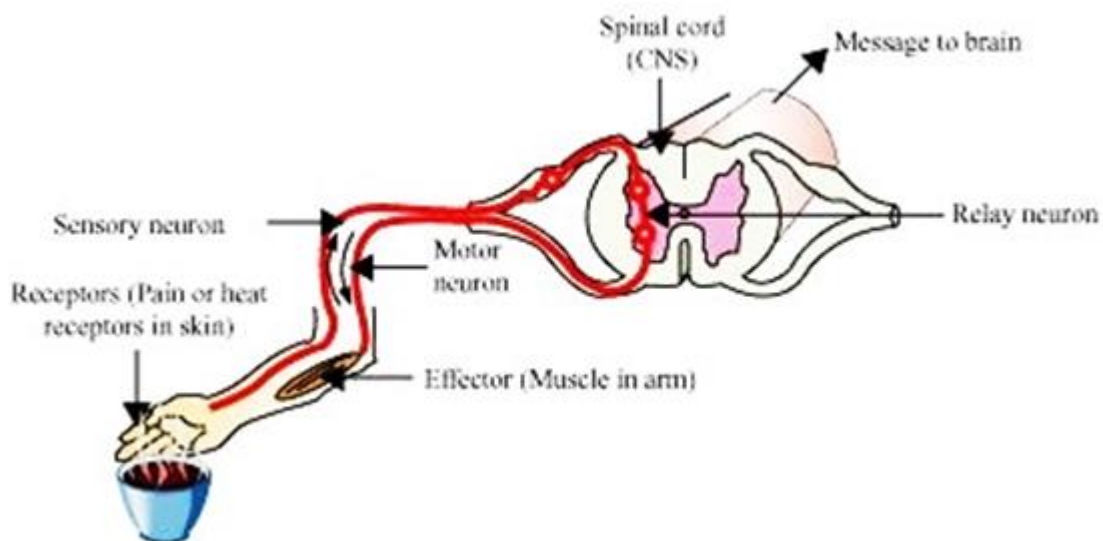
- A. (a)
- B. (b)
- C. (c)
- D. (d)

Answer: Because when adrenaline is secreted the blood supply to digestive system decreases and so concentration in liver decreases and whereas blood flow increases so the all undigested food concentration of glucose in blood increases.

Q. 6. A child is frightened by a loud noise and shouts for help. In which order the different types of neurons in neurons involved will act?

- A. Motor neurone → relay neurone → sensory neurone
- B. Motor neurone → sensory neurone → relay neurone
- C. Sensory neurone → motor neurone → relay neurone
- D. Sensory neurone → relay neurone → motor neurone

Answer: From the receptor the information passes from sensory neuron to relay neuron and then to motor neuron.



Q. 7. Following are certain reflex actions occurring in our body.

- I. Moving to the side of road when a speeding car approaches.
- ii. Closing of eyes in response to a sudden bright light.
- iii. Shouting when we are suddenly disturbed or get scared
- iv. Withdrawing hands on touching a hot surface. The reflex is given below, will be occurring for,



- A. I and II
- B. I,II and III
- C. I,II,III and Iv
- D. Only II and IV

Answer: Because all are the examples of reflex action. In all the examples a sudden response is given to stimuli.