

- Q1.** Which part of the brain maintains posture and equilibrium of the body?
- Q2.** How do we detect the smell of an *agarbatti* (incense stick)?
- Q3.** What is the function of occipital lobe?
- Q4.** Which part of brain links the endocrine system with nervous system?
- Q5.** Name the structural and functional unit of nervous system.
- Q6.** What is the response of stem towards light & gravity?
- Q7.** What is a ganglion?
- Q8.** Name the part of hindbrain which takes part in regulation of respiration.
- Q9.** We suddenly withdraw our hand when a pin pricks. Name the type of response involved in this action.
- Q10.** Name the structural and functional unit of human nervous system.
- Q11.** What is a neuron?
- Q12.** Name the largest cell present in the human body.
- Q13.** Name the membranes which protect the brain.
- Q14.** Name the bony structure that encloses and protects the brain.
- Q15.** What are plant hormones?
- Q16.** Which hormone helps in lowering the level of blood glucose in human beings?
- Q17.** What do you mean by geotropism?
- Q18.** Name the fluid filled between the meninges of the brain. What are its functions?
- Q19.** Name the plant hormone that inhibits the growth of plants.
- Q20.** Which plant hormone promotes ripening of fruits?
- Q21.** Which hormone is responsible for the development of moustache and beard in man?
- Q22.** Which type of glands in human body secrete hormones? State any one location for them.
- Q23.** Name the endocrine gland which secretes hormone glucagon.
- Q24.** Name the hormone which is commonly called 'birth hormone' and 'milk ejecting hormone'.
- Q25.** Name the two sets of nerves that constitute the peripheral nervous system.
- Q26.** Name the hormone which promotes plant growth.

Q27. Name the fluid filled between the meninges of the brain. What are its functions?

Q28. Write the function of hormone "thyroxine" produced in our body.

Q29. Name the hormones secreted by pancreas.

Q30. Name one sex hormone.

Q31. What is the result of hypothyroidism in children called?

Q32. What is the difference between a reflex action and walking?

Q33. What happens at the synapse between two neurons?

Q34. What is the role of brain in reflex action?

Q35. What is the need for a system of control and coordination in an organism?

Q36. Name the centre of the brain that controls

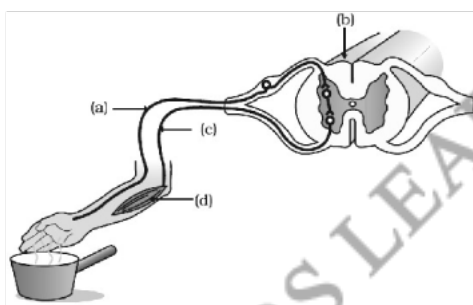
(a) Swallowing

(b) hearing

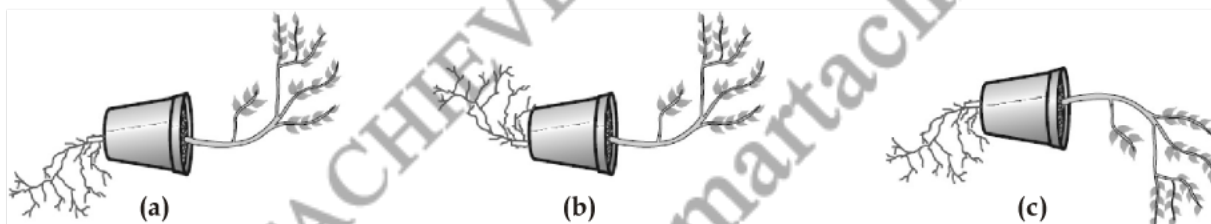
Q37. Represent schematically the path of a reflex action.

Q38. What is co-ordination? Give an example.

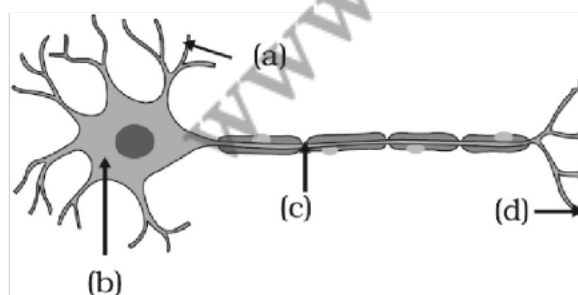
Q39. Label the parts (a), (b), (c) and (d) and show the direction of flow of electrical signals (shown in figure).



Q40. As shown in figure (a), (b) and (c), which appears more accurate and why?



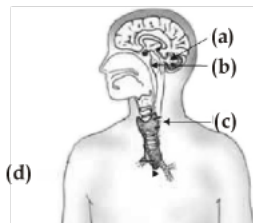
Q41. Label the parts of a neuron in figure.



- Q42.** Name the hormone responsible for regulation of:
- Metabolism of carbohydrates, fats and proteins.
 - Balance of calcium and phosphate.
 - Blood pressure.
 - Water and electrolytic balance.
- Q43.** Why are some patients of diabetes treated by giving injections of insulin?
- Q44.** How does our body respond when adrenaline is secreted into the blood?
- Q45.** Why is the use of iodised salt advisable?
- Q46.** How does chemical coordination take place in animals?
- Q47.** How do auxins promote the growth of a tendril around a support?
- Q48.** What are the changes seen in girls at the time of puberty?
- Q49.** How does chemical coordination occur in plants?
- Q50.** How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?
- Q51.** What is a tropic movement? Explain with an example.
- Q52.** What are plant hormones or phytohormones?
- Q53.** Name two activities which are regulated by plant pigments.
- Q54.** Give two examples of function in plants that are regulated by light
- Q55.** How is control and co-ordination between environment and plants brought about?
- Q56.** Differentiate between tropic and nastic movements in plants, give one example of each.
- Q57.** How do auxins promote the growth of a tendril around a support?
- Q58.** How does a touch - me - not plant respond on touching? What is this movement called?
- Q59.** Where does cerebrospinal fluid occur in our body? Mention any two of its functions.
- Q60.** Taking the example of auxins and cytokinins together, explain (a) a synergistic action in plants, (b) an antagonistic action in plants.
- Q61.** How are involuntary actions and reflex actions different from each other?
- Q62.** How do we detect the smell of an agarbatti (incense stick)?
- Q63.** What happens at the synapse between two neurons?
- Q64.** What is the difference between a reflex action and walking?
- Q65.** Match the terms of Column (A) with those of Column (B)

Column (A)	Column (B)
(a) Olfactory receptors	(i) Tongue
(b) Thermo receptors (temperature receptors)	(ii) Eye
(c) Gustatoreceptors	(iii) Nose
(d) Photoreceptors	(iv) Skin

- Q66.** Name the ovarian hormones and give the function of any one of them.
- Q67.** How endocrine glands do helps in maintaining feedback control?
- Q68.** Which types of glands in human body secrete hormones? State any one location for them.
- Q69.** Name any two heterocrine glands and mention their function.
- Q70.** 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. |
- Q71.** Label the endocrine glands shown in figure.



- Q72.** What will happen if intake of iodine in our diet is low?
- Q73.** Answer the following:
- | |
|---|
| (a) Which hormone is responsible for the changes noticed in females at puberty? |
| (b) Dwarfism results due to deficiency of which hormone? |
| (c) Blood sugar level rises due to deficiency of which hormone? |
| (d) Iodine is necessary for the synthesis of which hormone? |
- Q74.** 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? |
- Q75.** Why is the use of iodised salt advisable?
- Q76.** How does our body respond when adrenaline is secreted into the blood?
- Q77.** Why are some patients of diabetes treated by giving injections of insulin?
- Q78.** What is the function of receptors in our body? Think of situations where receptors do not work properly. What problems are likely to arise?
- Q79.** What is reflex arc? Draw diagram of reflex arc. Label on it the following:
- | | |
|--------------------|------------------|
| (a) Sensory neuron | (b) Motor neuron |
|--------------------|------------------|
- Q80.** Compare and contrast nervous control and hormonal mechanisms for control and coordination in animals.
- Q81.** How are involuntary actions and reflex actions different from each other?
- Q82.** Which signals will get disrupted in case of a spinal cord injury?
- Q83.** Draw the structure of a neuron and explain its function.

- Q84.** What is structural and functional unit of central nervous system.
What are its parts. State their function. (any two).
- Q85.** State the events in sequence that take place when an electrical impulse travels from a dendritic tip of a nerve cell to another nerve cell.
- Q86.** Name the two divisions of the autonomic nervous system in man. What are their effects on (i) Blood vessels (ii) Urinary bladder?
- Q87.** Describe the central nervous system in human beings under the following heads:
(i) Regions included
(ii) Three functions of any region.
- Q88.** Name any three receptors in human beings and write their functions also.
- Q89.** Differentiate between nervous system and hormonal system.
- Q90.** Give differences between endocrine and nervous control.
- Q91.** What is the function of receptors in our body? What happens when receptors do not work properly?
- Q92.** What is the need for a system of control and co-ordination in an organism?
- Q93.** Draw the structure of neuron and explain its function.
- Q94.** Where are Pons and medulla oblongata located? Write their functions.
- Q95.** Define 'nerve impulse'. Which structure in a neuron helps to conduct a nerve impulse?
(a) Towards the cell body? (b) Away from the cell body?
- Q96.** Differentiate between axon and dendrons?
- Q97.** Mention the structure of human brain.
- Q98.** Name the different lobes of cerebrum.
- Q99.** Nervous and hormonal system together performs the functions of control and co-ordination in human beings. Justify the statement.
- Q100** Describe Nervous system in humans.
- Q101** What are the major parts of the brain? Mention the functions of different parts.
- Q102** What constitutes the central and peripheral nervous systems? How are the components of central nervous system protected?
- Q103** What are reflex actions? Give two examples. Explain a reflex arc.
- Q104** How does chemical coordination take place in animals?
- Q105** 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?
- Q106** What is the role of the brain in reflex action?
- Q107** How is the movement of leaves of the sensitive plant different from the movement of a shoot towards light?

- Q108** Give an example of three plant hormone that promotes growth.
- Q109** What causes Tendril to encircle or coil around the object in contact with it. Explain the process involved.
- Q110** What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?
- Q111** How does chemical coordination occur in plants?
- Q112** Design an experiment to deconstrate hydrotropism.
- Q113** How does phototropism occur in plants?
- Q114** (a) What is (i) phototropism and (ii) geotropism?
(b) Mention the role of each of the following plant hormones:
(i) Auxin
(ii) Absciscic acid
- Q115** Mention three important functions of gibberellins.
- Q116** What are tropic movements? Name the types of tropic movements in plants.
- Q117** Name various plant hormones. Also give their physiological effects on plant growth and development.
- Q118** What is the difference between the manner in which movement takes place in a sensitive plant and the movement in our legs?
- Q119** Design an experiment to demonstrate hydrotropism.
- Q120** What are 'hormones'? Write any two functions of hormones.
- Q121** Draw a diagram of human brain and label the following parts:
(a) Cerebrum (b) Meninges (c) Medulla oblongata (d) Cerebellum
- Q122** Draw a diagram showing endocrine glands in a human male body. Label the following glands on it:
(a) Pituitary (b) Thyroid (c) Adrenal (d) Testes
- Q123** (a) Which hormone is responsible for the changes noticed in males at puberty?
(b) Deficiency of which hormone leads to dwarfism.
(c) Name the hormone which is injected to a diabetic patient.
- Q124** Name any three endocrine glands in human body and briefly write the function of each of them.
- Q125** Name two hormones secreted by pancreas. Write one function of each hormone names.
- Q126** Define 'hormones'. Name the hormone secreted by thyroid. Write its function, Why is the use of iodised salt advised to us?
- Q127** List the functions of testosterone and estrogen.
- Q128** Name the hormones secreted by thyroid, parathyroid and pancreas.
- Q129** Pituitary is a master endocrine gland. Justify this statement.
- Q130** How does our body respond when adrenaline is secreted into the blood?
- Q131** How does chemical co-ordination takes place in animals. Mention their function.

Q132 Compare and contrast nervous and hormonal mechanisms for control and coordination in animals.

Q133 Design an experiment to demonstrate hydrotropism.

Q134 What are hormone? Mention one function for each of these hormones.

(a) Thyroxine (b) Insulin (c) Adrenaline (d) Growth hormone (e) Testosterone.

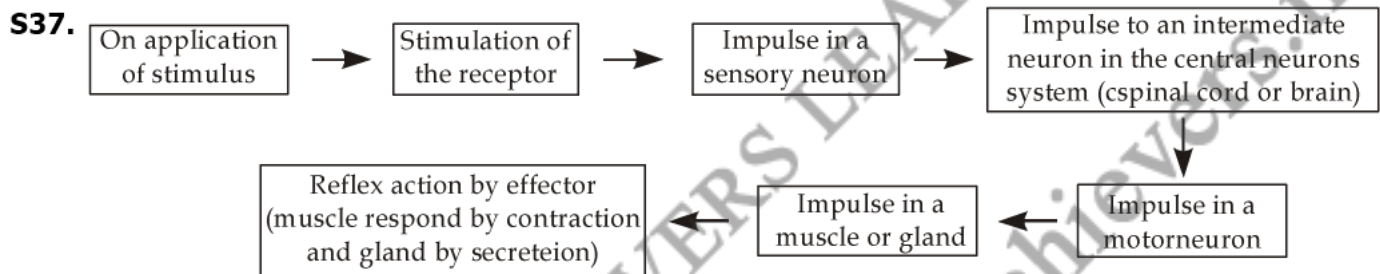
Q135(a) what are hormones ?

(b) list four characteristics of hormones

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- S1.** Cerebellum is the part of the hin-brain that maintains posture and equilibrium of the body.
- S2.** Smell of a *agarbatti* is initially detected by olfactory receptors located in our nose. They then send impulses to the olfactory centres in the forebrain.
- S3.** Occipetal lobe - visual perception.
- S4.** Hypothalamus.
- S5.** Neuron (nerve cell)
- S6.** Stem show positive response towards light and negative response toward gravity.
- S7.** It is a collection of nerve cells (neurons) located in the specific region of the body.
- S8.** Medulla oblongata.
- S9.** Reflex action.
- S10.** Neuron.
- S11.** A neuron is the structural and functional unit of the nervous system in animals.
- S12.** Neuron.
- S13.** Meninges.
- S14.** Cranium or brainbox of the skull.
- S15.** Plant hormones or phytohormones are chemicals which help to regulate growth, development, flowering and other physiological processes.
Example: Auxin, gibberelline and ethylene.
- S16.** Insulin.
- S17.** Downward movement of roots in response to Gravitational force is called geotropism.
- S18.** Cerebrospinal fluid. It protects the brain form mechanical shocks.
- S19.** Absciscic acid (ABA).
- S20.** Ethylene.
- S21.** Testosterone.
- S22.** Endocrine or ductless glands, *e.g.*, thyroid in neck region around trachea.
- S23.** Pancreas.
- S24.** Oxytocin.
- S25.** Sympathetic nervous system and Parasympathetic nervous system.
- S26.** Auxin.

- S27.** Cerebrospinal fluid. It protects the brain from mechanical shocks.
- S28.** It controls overall metabolic rate of the body.
- S29.** Insulin and Glucagon.
- S30.** Testosterone.
- S31.** Hypothyroidism in children called exophthalmic goiter. It causes bulging of eyes, increases blood pressure and heart beat.
- S32.** Reflex action is a nerve mediated, automatic involuntary response to a stimulus without consulting the will. It is controlled by spinal cord. It needs an instantaneous response to a stimulus where delay can be harmful, on other hand walking is controlled and voluntary action.
- S33.** At synapse, the electrical impulse generated at nerve ending of a neuron is passed on to dendrite of another neuron. It also passes information on to a muscle or gland to act as ordered by brain or spinal cord. This transmission at synapse is carried out by chemicals known as neurotransmitter.
- S34.** Reflex arc are formed in the spinal cord itself although the information also goes on to reach brain here the encounter remains in the memory and make us aware of our action. Secondly there are certain reflex actions under the control of brain known as cerebral reflex. Closure of eyes exposed to flash of light, salivation at sight or smell of food, peristalsis, inspiration and expiration are few examples of cerebral reflexes.
- S35.** An organism has different organs which perform various functions. The survival of an organism depends on integrated and coordinated functions of these organs. Nervous and endocrine system of an organism make them work together like parts of one machine to accomplish coordination.
- S36.** (a) Medulla oblongata in hind brain.
(b) Swallowing cerebrum in fore brain - Hearing.



- S38.** The working together of the various systems in a body to adjust the vital activities of life is called co-ordination.
For Example: The nervous system receives information from the surroundings, then processes and interprets it and finally responds accordingly. The endocrine system helps in control and co-ordination.
- S39.** (a) Sensory neuron (b) Spinal cord (CNS)
(c) Motor neuron (d) Effector = Muscle in arm
- S40.** Figure (a) is more appropriate because in a plant shoots are negatively geotropic hence, grow upwards and roots are positively geotropic so grow downwards.
- S41.** (a) Dendrite (b) Cell body (c) Axon (d) Nerve ending
- S42.** (a) Thyroxine hormone (b) Calcitonine hormone
(c) Adrenaline hormone (d) Vasopressin hormone
- S43.** Diabetes is caused due to deficiency or less secretion of insulin by pancreas. In such person, the blood sugar level is high. Insulin converts excess sugar present in blood into glycogen. Patients suffering from diabetes are given insulin injection to control their blood sugar level.

- S44.** When adrenaline is secreted into the blood stream by adrenal gland in response to cold, joy, anger, fear and emotional stress. The hormone increases the blood supply to heart and skeletal muscles. The small arteries around digestive system and skin constricts thus diverting the blood to our muscles. The breathing rate also increases because of the contractions of diaphragm and the rib muscles. All these responses together enable our body to deal with an emergency situation.
- S45.** Iodine is necessary for the production of thyroxine hormone by the thyroid gland. In case, iodine is deficient in our diet, there is a possibility that we might suffer from goitre. Iodised common salt is a source of iodine. So as to avoid deficiency of iodine, iodised salt is recommended.
- S46.** Chemical coordination in animals is done by hormones. These hormones are secreted by endocrine glands. These hormones are directly poured into the blood via which they reach the target tissue or organ to act.
- S47.** Auxin is synthesized at the shoot tip. It helps the cell grow longer. When a tendril comes in contact with a support, auxin stimulates faster growth of the cells on the opposite side, so that the tendril forms a coil around the support. This makes the tendrils appear as a watch spring.
- S48.** Secondary sexual characteristics in girls:
- Increase in breast size and darkening of skin of the nipples present at the tips of the breasts.
 - Appearance of hair in the genital area.
 - Appearance of hair in other areas of skin like underarms, face, hands, and legs.
 - Increase in the size of uterus and ovary.
 - Beginning of menstrual cycle.
 - More secretion of oil from the skin, which results in the appearance of pimples.
- S49.** In animals, control and coordination occur with the help of nervous system. However, plants do not have a nervous system.
- Plants respond to stimuli by showing movements. The growth, development, and responses to the environment in plants is controlled and coordinated by a special class of chemical substances known as hormones. These hormones are produced in one part of the plant body and are translocated to other needy parts. For example, a hormone produced in roots is translocated to other parts when required. The five major types of phytohormone are auxins, gibberellins, cytokinins, abscisic acid, and ethylene. These phytohormones are either growth promoters (such as auxins, gibberellins, cytokinins, and ethylene) or growth inhibitors such as abscisic acid.
- S50.** The movement of leaves of the sensitive plant, *Mimosa pudica* or “touch me not”, occurs in response to touch or contact stimuli. This movement is independent of growth. The movement of shoot towards light is known as phototropism. This type of movement is directional and is growth dependent.
- S51.** The directional growth movements of plants due to external stimuli are called tropic movement. It can be either towards the stimulus, or away from it. For example, in case of phototropic movement, shoots respond by bending towards light while roots respond by bending away from it.
- S52.** Plant hormones or phytohormones are naturally-occurring organic substances. These are synthesized in one part of the plant body (in minute quantities) and are translocated to other parts when required.
- The five major types of phytohormones are auxins, gibberellins, cytokinins, abscisic acid and ethylene.
- S53.** (a) Some specialized pigments, phytochromes are responsible of the response to photoperiodic stimulus.
(b) The control and co-ordination in plants with its environment is regulated by phytohormones & phytochromes together.
- S54.** (a) Breaking of dormancy (seed germination).
(b) Flowering.

S55. Plants do not have a nervous system for control & co-ordination like animals but do give response to external stimuli like touch, light and chemicals etc. plants responses are mainly of two types - Growth dependent and growth independent response. Growth independent Responses are because of change in the amount of water. Growth dependent responses are due to cell divisions.

S56.	Tropic movements	Nastic movements
	(i) Direction of movement is in the direction of the stimulus. (ii) Movements are slow. Example: The growth of the pollen tube towards a chemical produced by an ovule during the process of fertilization in a flower.	(i) Direction of movement is not determined by the direction of stimulus. (ii) Movements are fast. Example: The folding up and drooping of leaves of the sensitive 'touch-me-not' plant.

S57. When tendrils come in contact with any support, the tip of the tendril in contact with the object does not grow as rapidly as the part of the tendril away from the object. This is due to the fact that auxin secreted in the tip diffuses towards the side opposite to the point of contact. So this induces more growth on the side opposite to the point of contact. Thereby causing the tendril to circle around the object.

S58. Touch - me - not plant folds its leaflets on touching. This type of movement is called Growth independent movement.

S59. The cerebrospinal fluid occurs in the sub-arachnoid space in the cerebral ventricles and spinal canal.

Functions:

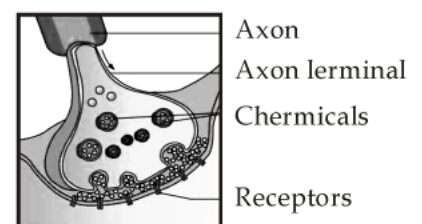
- (a) It serves to maintain a constant pressure inside the cranium.
- (b) It provides protection to the brain against mechanical injury and shock.

S60. (a) A synergistic action in plants: In tissue cultures of parenchyma, mitosis are accelerated when both auxin and cytokinin are present.
(b) an antagonistic action in plants: Auxin stimulates the growth of apical bud and suppresses the growth of lateral buds (apical dominance), whereas cytokinin promotes the growth of lateral buds and suppresses apical dominance.

S61. Involuntary actions cannot be consciously controlled. For example, we cannot consciously control the movement of food in the alimentary canal. These actions are however directly under the control of the brain. On the other hand, the reflex actions such as closing of eyes immediately when bright light is focused show sudden response and do not involve any thinking. This means that unlike involuntary actions, the reflex actions are not under the control of brain.

S62. The thinking part of our brain is the forebrain. It has separate areas that are specialized for hearing, smelling, sight, taste, touch, etc. The forebrain also has regions that collect information or impulses from the various receptors. When the smell of an incense stick reaches us, our forebrain detects it. Then, the forebrain interprets it by putting it together with the information received from other receptors and also with the information already stored in the brain.

S63. A very small gap that occurs between the last portion of axon of one neuron and the dendrites of the other neuron is known as a synapse. It acts as a one way valve to transmit impulses in one direction only. This uni-direction transfer of impulses occurs as the chemicals are produced in only one side of the neuron *i.e.*, the axon's side. From axon, the impulses travel across the synapse to the dendrites of the other neuron.



S64. A reflex action is a rapid, automatic response to a stimulus. It does not involve any thinking. For example, we close our eyes immediately when the bright light is focused. Walking, on the other hand, is a voluntary action. It is under our conscious control.

- S65.** (a) – (iii) (b) – (iv) (c) – (i) (d) – (ii)

S66. The hormones secreted by ovaries are estrogen and progesterone.

At puberty, estrogens stimulate the growth, maturation and functions of female secondary sex organs such as uterus, fallopian tubes and the duct system of mammary glands.

S67. The timing and amount of hormones released are regulated by feedback mechanism. For example, glucose level in the blood is maintained constant (0.1%). The blood glucose levels may be maintained constantly by either of the following feedback mechanism.

- (a) High glucose level in the blood induces the pancreatic cells to produce insulin which converts glucose to glycogen.
 (b) Less glucose level in the blood do not induce the pancreatic cells to produce insulin so that less conversion of glucose to glycogen may occur.

S68. There are three types of glands which secrete hormone in human body:

- (a) Exocrine gland - These are duct glands which do not secrete their secretion into the blood.
 For Example: Salivary gland. it secretes salivary amylase which digest starch.
 (b) Endocrine gland - These are ductless gland, and they pour their secretion in blood.
 For Example: Pituitary gland. It is master gland, controls most of the activities.
 (c) Heterocrine gland - Which act as both endocrine and exocrine type of glands.
 For Example: Pancreas - Endocrine part produces hormone insulin and glycogen and exocrine part produce digestive enzymes.

S69.	Heterocrine gland	Endocrine function	Exocrine function
	Pancreas	Produce insulin & glucagon	Produce digestive enzymes
	Ovaries	Produce estrogen and progesterone hormone	Produce female gametes

S70. (a) Auxin (b) Gibberellin (c) Cytokinin (d) Abscisic acid

S71. (a) Pineal gland (b) Pituitary gland (c) Thyroid (d) Thymus

S72. (a) When iodine intake is low, release of thyroxin from thyroid gland will be less by which protein, carbohydrate and fat metabolisms will be affected.
 (b) A person might suffer from goitre in case of iodine deficiency in the body.

S73. (a) Oestrogen (b) Growth hormone (c) Insulin (d) Thyroxin

S74. (a) Pituitary (b) Pancreas (c) Adrenal (d) Testes

S75. Iodine stimulates the thyroid gland to produce thyroxin hormone. It regulates carbohydrate, fat, and protein metabolism in our body. Deficiency of this hormone results in the enlargement of the thyroid gland. This can lead to goitre, a disease characterized by swollen neck. Therefore, iodised salt is advised for normal functioning of the thyroid gland.

S76. Adrenalin is a hormone secreted by the adrenal glands in case of any danger or emergency or any kinds of stress. It is secreted directly into the blood and is transported to different parts of the body.

When secreted in large amounts, it speeds up the heartbeat and hence supplies more oxygen to the muscles. The breathing rate also increases due to contractions of diaphragm and rib muscles. It also increases the blood pressure. All these responses enable the body to deal with any stress or emergency.

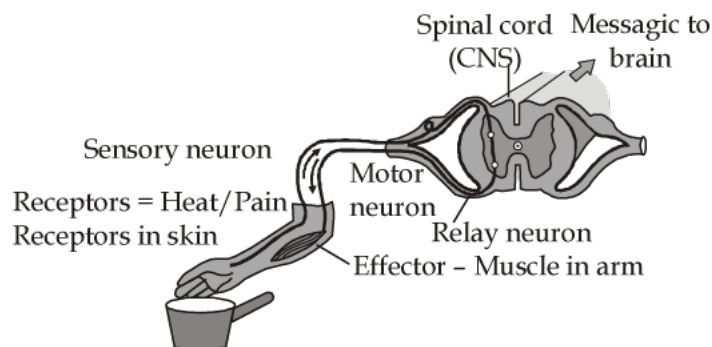
S77. Diabetes is a disease in which the level of sugar in the blood is too high. Insulin, a hormone secreted by the pancreas, helps in regulating the blood sugar levels. This is the reason why diabetic patients are treated by giving injections of insulin.

S78. Receptors are cells, tissues and organs which are capable of receiving particular stimuli and initiate impulses to be picked up by sensory nerves. These receptors are located in our sense organs such as the inner ear, nose, tongue, eyes and skin etc.

In case any of the receptors do not work properly we will not be able to perceive that particular information. For example, if our gustatory receptors located in tongue do not work we will not perceive the taste of food such as sour, sweet, salty or bitter.

S79. Reflex Arc: Path followed by an impulse from a receptor organ to an effective organ.

Diagram of Reflex Arc:



S80. Difference between nervous control and hormonal control:

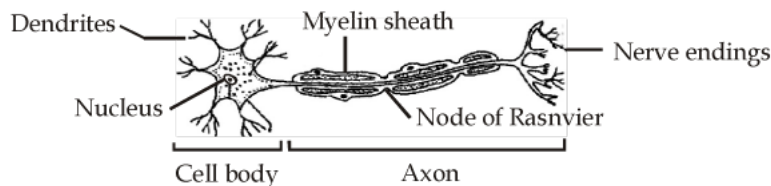
Nervous control	Hormonal control
(i) It consists of nerve impulses conducted by neurons from one specific structure to another.	(i) It consists of endocrine system which secretes chemical messengers hormone secreted directly in blood.
(ii) Nerve impulses produce rapid short lasting responses.	(ii) Hormones produce longer lasting responses.
(iii) Nerve impulses are not specific in their action.	(iii) Action of hormones is highly specific.

S81. Difference between involuntary actions and reflex actions are as follows:

Involuntary actions	Reflex actions
It is a set of muscle movement over which we do not have thinking control. Such actions are controlled by brain. Example: Contraction of muscle of our digestive tract, Beating of heart muscle.	It is rapid, spontaneous and involuntary activity that is produced in response to a stimulus. It is controlled by spinal cord. Example: Removal of hand with a jerk when someone touches a hot object accidentally.

- S82.** (a) Reflex action: In case of spinal cord injury reflex action will not be completed because it is junction point of sensory and motor nerves.
 (b) Impulses from various body parts will not be conducted to brain.
 (c) Message from brain will not be conducted to various organs and glands.

- S83.** Neurons are the structural and functional unit of nervous system that is specialised to receive, conduct and transmit impulses. A neuron can be sensory, motor or connector in nature. Neuron acquires particular information through dendrite located on its cell body. This information is then passed on to the axon, finally, the axon endings passes the information into next neuron at the synapse.



As soon as the impulse reaches the dendrite, an electrical impulse is generated due to certain chemical change in neuron. When the impulse reaches axon ending some chemicals are released which pass on the impulse to next neuron. These chemicals are known as neurotransmitters. A similar synapse finally allows delivery of such impulses from neurons to other cells, such as muscles cells or gland.

- S84.** Neuron.

Components: Cell body, Dendrite, Axon.

Function: Dendrites carry the nerve impulse towards the cell body.

Axons carry the nerve impulse away from the cell body.

- S85.** The information acquired at the end of the dendritic tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar chemical impulse in a dendrite of the next neuron.

- S86.** The two divisions of autonomic nervous system are sympathetic nervous system and parasympathetic nervous system.

- (i) Sympathetic nervous system causes constriction of narrow blood vessels. It brings about relaxation of urinary bladder.
- (ii) Parasympathetic nervous system has an opposite effect. It causes dilation of narrow blood vessels and contraction of urinary bladder.

- S87.** (i) **Regions:** Brain and spinal cord. Brain has three parts - forebrain, midbrain and hindbrain.

- (a) Forebrain has three regions - Cerebrum, cerebral hemispheres, diencephalon.
- (b) Midbrain.
- (c) Hindbrains has - cerebellum, pons, medulla oblongata.

- (ii) **Functions of Forebrain:**

- (a) Seat of intelligence,
- (b) Control of voluntary movements (frontal lobes)
- (c) Centre of general sensations, taste (parietal lobes), smell (olfactory lobes), hearing (temporal lobes) and sight (occipital lobes).

- S88.** (i) Olfactory receptors detect smell.

- (ii) Gustatory receptors detect taste.

- (iii) Photoreceptors detect light.

S89.	Nervous System	Hormonal System
	<ol style="list-style-type: none"> 1. On stimulation immediate effect is observed e.g., reflex action. 2. Nerve impulse is carried along the neurons. 3. Nervous system does not affect growth. 4. Basic unit is a neuron. 5. Messages are transferred in the form of electrical impulses. 	<ol style="list-style-type: none"> 1. Hormonal effect is slow and delayed. 2. Hormones are transmitted along with the blood stream. 3. Hormones affect the growth. 4. Hormones constitute the system. 5. Message are transferred by the chemical messengers called hormones.

S90.	Endocrine (Hormonal) Control	Nervous Control
	<ol style="list-style-type: none"> 1. Works by the release of chemical messengers, the hormones. 2. Work slowly. 3. Hormones are transported through blood stream. 4. Information is spread throughout the body by blood stream. 5. It affects growth. 6. It has prolonged effect. 	<ol style="list-style-type: none"> 1. Works by the conduction of nerve impulses. 2. Works very rapidly. 3. Nerve impulses are conducted through more fibres. 4. Information is directed to a specific part. 5. It has no effect on growth. 6. It has short lived effect.

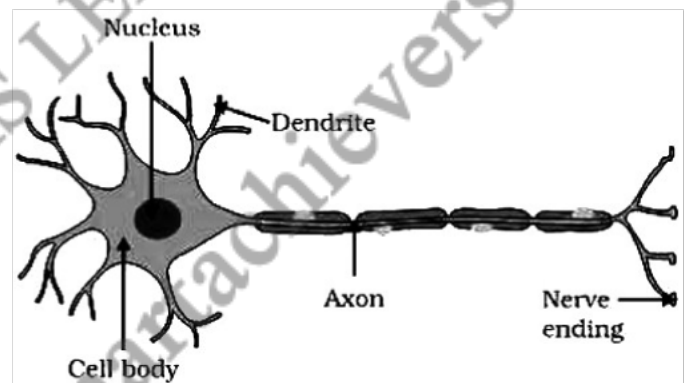
S91. The function of receptors is to defect information form the environment. If receptors do not work properly, the information obtained form the environment will be delayed to reach the spinal cord or brain. In this situation, the response to the environmental stimulus will be delayed causing harm to the body.

- S92.** (a) It evokes an appropriate movement in response to any change in external environment.
 (b) Multicellular organisms have complex body. So it, co-ordinates various organs of body of an organism work together in a proper manner to produce proper reaction to stimulus.

S93. Neuron has three components:

- (a) Cell body
- (b) Dendrites
- (c) Axon

The dendrite picks up the nerve impulse from receptors and then pass the impulses to the cell body and then along the axon. The axon passes the impulse to another neuron through a junction called synapse.



S94. Pons and medulla Oblongata are located in hind brain.

Pons acts as bridge between brain and spinal cord.

Medulla oblongata:

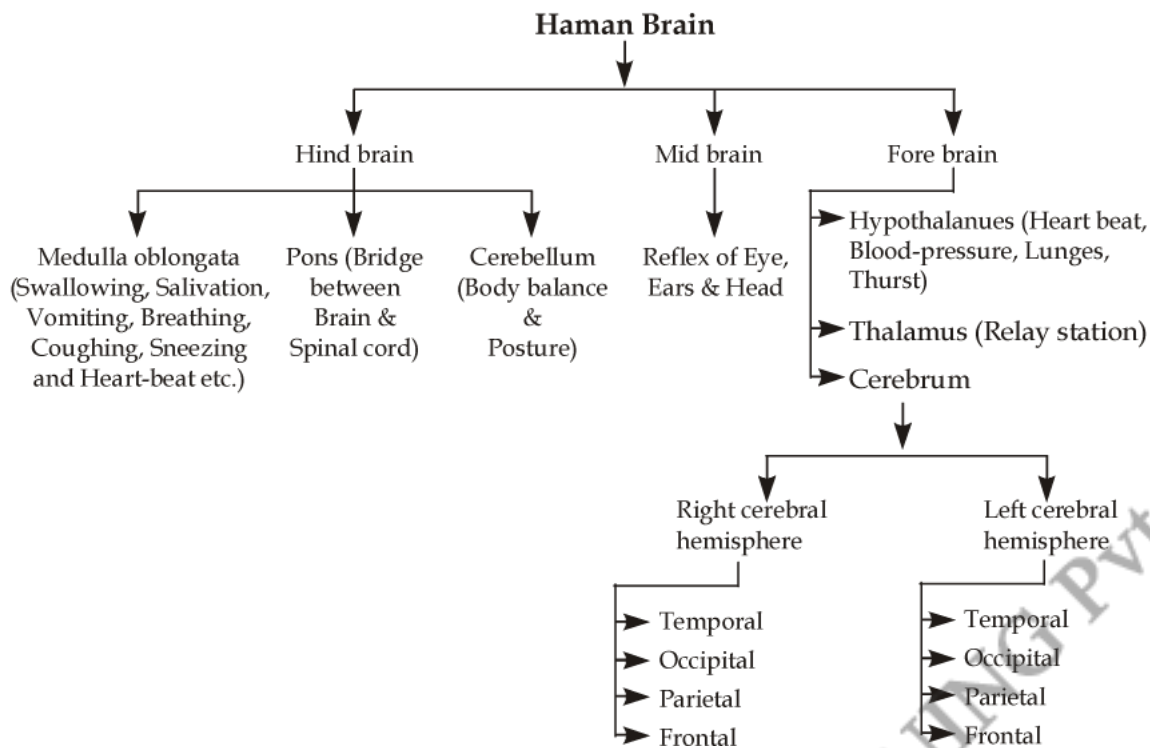
- (a) It is the reflex centre to control activities like salivation, swallowing, vomiting, breathing, coughing, sneezing and heart beat
- (b) It also controls sleeps, consciousness and activities of cerebrum

S95. Nerve Impulse - It is the passing of information through neurons is in the form of electrical and chemical signals. This is called nerve impulse.

- (a) Dendrite
- (b) Axon

S96.	Axon	Dendron
	They are long in size and one in number Generally unbranched Terminal branches have swollen knobs Direction of nerve impulse is away from cyton	They are small in size and numerous. Branched Terminal swollen knobs are absent. Direction of impulse is towards cyton.

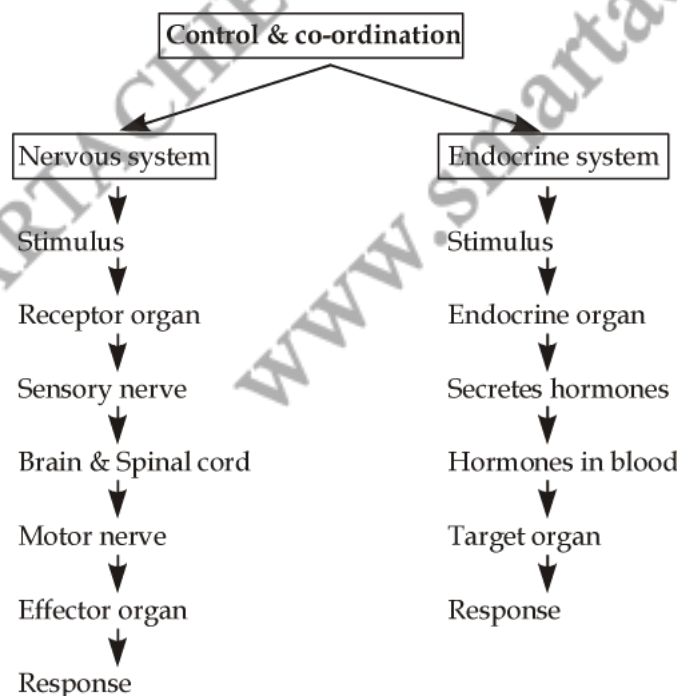
S97.



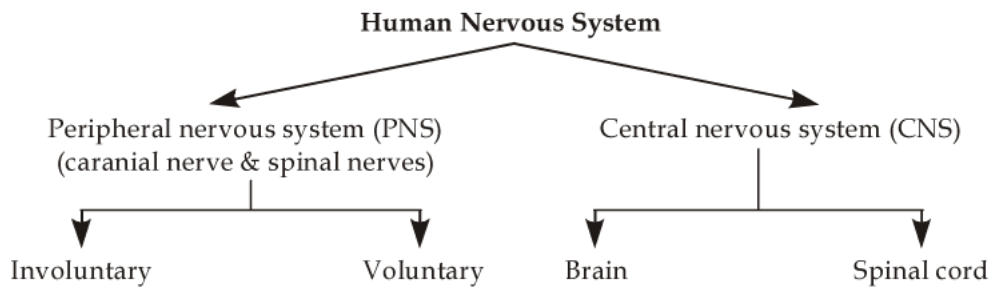
S98. Different lobes of cerebrum:

- Frontal lobe:** It is associated with reasoning .
- Parietal:** Perception of general sensation s like pressure, touch and pain.
- Occipital:** Visual perception.
- Temporal:** Important for interpreting sounds and the language we hear and formation of memories.

S99. A number of interactions between the environment and the animal are a result of combined action of both neurons and endocrine system for which specialized tissues are used to provide control and co-ordinations activities.



S100 Flow chart of human nervous system



S101 Hints: Fore brain

Mid brain

Hind brain

Give its functions.

S102 Hints: Brain and spinal cord

Brain box and vertebral column.

S103 Hints: Definition

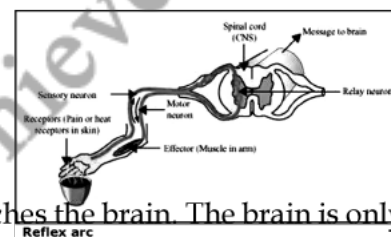
Nerve impulses

S104 Different endocrine glands secrete different hormones. These hormones are released into blood which carry them to specific tissues or organs called target tissues or target organs. In the target tissues, hormone triggers a particular biochemical or physiological activity.

S105 When an electrical signal reaches the axonal end of a neuron, it releases a chemical substance. This chemical diffuses towards the dendrite end of next neuron where it generates an electrical impulse or signal. Hence, the electrical signal is converted into a chemical signal at the axonal end. Since these chemicals are absent at the dendrite end of the neuron the electrical signal, cannot be converted into chemical signal.

S106 Reflex actions are sudden responses, which do not involve any thinking. For example, when we touch a hot object, we withdraw our hand immediately without thinking as thinking may take time which would be enough to get us burnt.

The sensory nerves that detect the heat are connected to the nerves that move the muscles of the hand. Such a connection of detecting the signal from the nerves (input) and responding to it quickly (output) is called a reflex arc. The reflex arcs "connections present between the input and output nerves" meet in a bundle in the spinal cord.



Reflex arcs are formed in the spinal cord and the information (input) reaches the brain. The brain is only aware of the signal and the response that has taken place. However, the brain has no role to play in the creation of the response.

S107 Difference between movement of leaves of sensitive plants and movement of shoot towards light:

<i>Movement of leaves of sensitive plants</i>	<i>Movement of shoot towards light</i>
(i) Growth independent movement.	(i) Growth dependent movement.
(ii) Movement is non-directional <i>i.e.</i> , it is neither towards nor away from the stimulus.	(ii) Movement is towards the source of stimulus (light). So it is a directional movement stimulus.
(iii) Such movements are referred as nastic movements.	(iii) Such movements are referred as tropic movements.

S108 Auxin promotes growth of cells.

Gibberellins promote elongation of stem.

Cytokinins promote cell division.

S109 Auxin diffuses to the other part which is away from the support.

Part of the tendril in contact from the support does not grow rapidly.

Part of the tendril away from the support grow rapidly and cause the tendril to grow around a support.

S110 Difference between movement in a sensitive plant and movement in our legs:

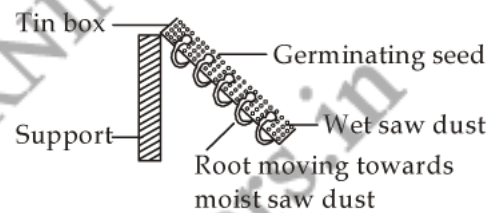
<i>Movement in a sensitive plant</i>	<i>Movement in our legs</i>
(i) There is no specialised tissue in plants for conduction of information.	(i) There is specialised nervous tissue in animals for conduction of information and muscle cells to help in movement.
(ii) Plant cells change shape by changing the amount of water in them.	(ii) Muscle cells contract or relax to effect movement.
(iii) Plant cells do not have specialised proteins.	(iii) Muscle cells have specialised protein which help muscles to contract or relax.

S111 Chemical coordination in plants is brought about by plant hormones also known as phyto-hormones. These hormones either promote growth or inhibit it. Five major types of plant hormones are auxin, gibberellin, cytokinin, abscisic acid and ethylene.

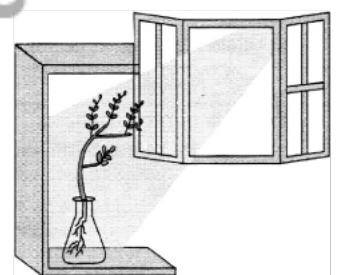
Auxin, gibberellin and cytokinin are referred as growth promoters whereas abscisic acid and ethylene are growth inhibitors.

Certain physiological processes like seed germination and lowering respond to the daily duration of light hours or photoperiods. Plants respond to this photoperiodic stimulus by a specialised pigment called phytochrome.

S112 Take a tin box with numerous holes at the bottom. Fill it with moist saw dust. Show some gram seeds in it. Keep the tin box in a tilted position as shown in the diagram. When seeds start germinating, moisten the saw dust again. We will observe that the radicle from the germinating seeds come out of the holes under the influence of gravity. However after some growth they bend back and enter the moist saw dust. This experiment demonstrates that roots are positively hydrotropic. Secondly hydrotropic response is stronger than geotropic response.



S113 Phototropism is a directional growth movement which occurs in response to unidirectional exposure to light. The region of photoreception is shoot apex where auxin is produced. Auxin moves from illuminated region to the shaded region. This causes more growth on the dark side of stem causing it to bend towards the source of light. Movement of shoot towards light is called phototropism. This movement is caused due to more growth of cells towards the shaded side of the shoot as compared to the side of shoot towards light. More growth of cells is due to secretion of auxin towards the shaded side.



- S114**(a) (i) **Phototropism.** The movement of a plant or it's part in response to light.
 (ii) **Geotropism.** The movement of a plant or it's part in response to gravity. For details, see test.
 (b) (i) **Auxin.** Stimulate the cells to grow longer/promotes growth/cell elongation.
 (ii) **Abscisic acid.** It inhibits growth/wilting of leaves or any other.

S115 Functions of Gibberellins:

- Stimulate stem elongation.
- Help in breaking seed dormancy.
- Promote flowering in some plants even under unfavorable conditions
- Help in seed germination.
- Promote production of male flowers.

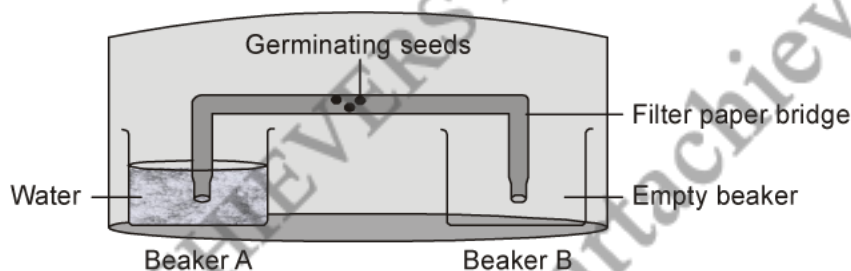
S116The bending or movement of a part of plant in response to the external stimulus is called tropism or tropical movement. It is of following types.

- Phototropism:** It is response to light. It may be towards light (positive) or away from the light (negative).
- Geotropism:** It is response to gravity - It may be towards stimulus (positive) and away from the stimulus (negative)
- Chemotropism:** Response to chemicals. It may be positive or negative.
- Hydrotropism:** Response to water. It may be positive or negative.

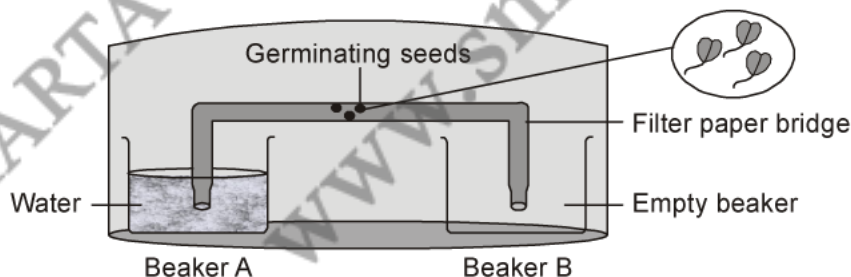
S117Hints: Auxin
Gibberellin
Cytokinin
Abscisic acid

S118. Movement in sensitive plants	Movement in our legs
<ol style="list-style-type: none"> The movement that takes place in a sensitive plant such as <i>Mimosa pudica</i> occurs in response to touch (stimulus). For this movement, the information is transmitted from cell to cell by electrochemical signals as plants do not have any specialised tissue for conduction of impulses. For this movement to occur, the plant cells change shape by changing the amount of water in them. 	<ol style="list-style-type: none"> Movement in our legs is an example of voluntary actions. The signal or messages for these actions are passed to the brain and hence are consciously controlled. In animal muscle cells, some proteins are found which allow the movement to occur.

S119Take two small beakers and label them as A and B. Fill beaker A with water. Now make a cylindrical-shaped roll from a filter paper and keep it as a bridge between beaker A and beaker B, as shown in the figure. Attach few germinating seeds in the middle of the filter paper bridge. Now, cover the entire set-up with a transparent plastic container so that the moisture is retained.



Observation: The roots of the germinating seeds will grow towards beaker A.



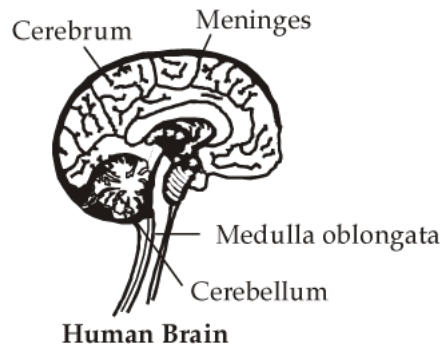
This experiment demonstrates the phenomenon of hydrotropism.

S120. 'Hormones' are chemical substances secreted in trace amounts by specialized tissues called endocrine glands.

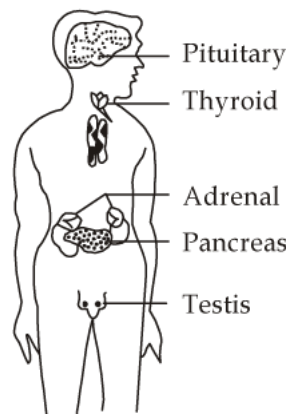
The two functions of hormones are as follows:

- (a) Hormones coordinate the activities of the body and also its growth.
- (b) Hormones regulate many functions like metabolism and reproduction in our body.

S121.



S122.



S123(a) Testosterone.

(b) Growth hormone.

(c) Insulin.

S124. Thyroid, Pancreas, Pituitary, Testes, Ovary.

Functions Thyroid - Secretion of thyroxin hormone.

Pancreas - Secretes insulin hormone.

Tetes - Produce sperms.

S125. Two hormones secreted by pancreas are: (i) insulin and (ii) Glucagon.

Insulin converts glucose into glycogen and thus, reduces the sugar / glucose level in the blood to normal limit.

Glucagon converts glycogen into glucose and thus, increases the sugar / glucose level in the blood.

S126 Hormones are chemical substances found in living being which perform' the function of control and coordination of various physiological activities.

The hormone secreted by thyroid gland is thyroxine. It regulates carbohydrate, fats and protein, metabolism.

Iodine is a constituent of thyroxine. Iodized salt provides sufficient iodine for thyroxine formation, otherwise the deficiency of thyroxin develops a disorder called goitre.

S127(a) Functions of Testosterone:

- (i) Responsible for sperm production.
- (ii) Essential for the development of secondary sexual characteristics such as beard and moustache in males.

(b) Functions of estrogen:

- (i) Responsible for production of the ova or eggs.
- (ii) Essential for development of secondary sexual characters such as axillary hair and mammary glands in females.
- (iii) Maintains the monthly menstrual cycle.
- (iv) Begins the rebuilding of uterus wall.

S128(i) Hormones secreted by thyroid gland are: thyroxine (T_4) triiodothyronine (T_3) and calcitonin.

- (ii) Hormone secreted by parathyroid's is parathormone.
- (iii) Hormones of pancreas are insulin and glucagon.

S129 Pituitary gland is also known as master gland because it controls the activities of most of the gland. It regulates the secretion of other glands. Like

- (a) **Growth hormones:** Body growth and development of bones
- (b) **Thyroid stimulating hormone:** Secretion of hormones from thyroid gland.
- (c) **Adrenocorticotrophic hormone:** Secretion of hormones from adrenal glands.
- (d) **Follicle stimulating hormone:** Stimulating of growth of ovaries and testes
- (e) **Luteinizing hormone:** Secretion of hormone from ovaries & testes
- (f) **Prolactin:** Regulation of function of mammary gland. Hence, most of functions are controlled by pituitary gland so it is called master gland.

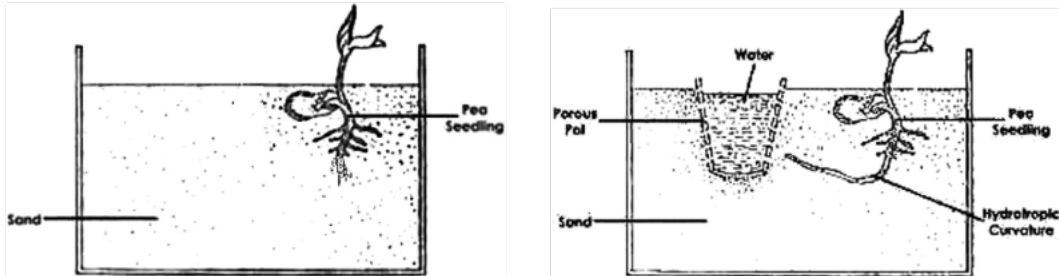
S130 When adrenaline is secreted into the blood, it prepares our body for action. It speeds up heart beat and breathing, raises blood pressure and allows more glucose to go into the blood to give us a lot of energy quickly to fight or run away from frightening situation. The blood supply decreases from the skin and digestive system and increase to skeletal muscles. All these conditions help the individual to respond the emergency situation.

S131 The chemical co-ordination in animals takes place through hormonal system called endocrine system. Animal hormones are chemical messengers which are directly poured into the blood by the endocrine glands. Thus, a hormone reaches to the cells. The cells have special molecules on their surface to detect these chemical compounds and recognize the information a particular hormone carrying. There the cells act accordingly. The chemical co-ordination is fast as hormones diffuse readily around the cells.

S132	Nervous system mechanism	Hormonal system mechanism
	1. The information is conveyed in the form of electric impulse.	1. The information is conveyed in the form of chemical messengers.
	2. The axons and dendrites transmit the information through a coordinated effort	2. The information is transmitted or transported through blood.
	3. The flow of information is rapid and the response is quick.	3. the information travels slowly and the response is slow.
	4. Its effects are short lived.	4. It has prolonged effects.

- S133**(a) Take two glass troughs *A* and *B* and fill each one of them two-thirds with soil.
- (b) In troughs *A* plant a tiny seedling. In trough *B* plants a similar seedling and places a clay pot inside the soil.
- (c) Water the soil in trough *A* daily and uniformly. Do not water the soil in trough *B* but put some water in clay pot and leave both the trough for a few days.
- (d) Now, dig up the seedling carefully from both the troughs without damaging their roots.

Observation: Roots of seedling in trough in *A* is straight. The root of seedling in trough *B* is bent to the right side *i.e.*, toward the clay pot containing water.



S134 Hormones are chemical substances which are secreted in very less amount by specialized tissues called endocrine glands.

- (a) **Thyroxin:** Control overall metabolic rate of the body (carbohydrate, protein and fat metabolism)
- (b) **Insulin:** Conversion of glucose to glycogen in liver and muscles, thus decreases blood glucose level.
- (c) **Adrenalin:** increases heart beat, blood pressure and blood glucose level.
- (d) **Growth hormone:** Body growth and development of bones.
- (e) **Testosterone:** Development of male sex organ and secondary sex characteristics like moustache, beard & voice.

S135 Hormones are chemical substances which are secreted in very less amount by specialized tissues called endocrine glands.

Characteristics of hormones are:

- (a) They are required in very less amount.
- (b) Hormones are specific in their function.
- (c) They act away from the site of production.
- (d) Deficiency or over secretions of hormones have negative effects in the body.