Control And Coordination

Assess Yourself

Q. 1. Name the neurons which carry impulses from receptor to brain.

Answer: Sensory neurons are the neurons that carry impulses from receptor to the brain where the sensation is interpreted. Sensory neurons are afferent neurons since they take the sensation towards brain or spinal cord (CNS).

Q. 2. What is spinal cord? How is it protected?

Answer: Spinal cord is a part of the central nervous system that is housed inside the vertebral column. It is an extension of the brain and is responsible for reflex actions. Spinal cord receives impulses from the sense organs and controls body responses.

The spinal cord is protected by vertebrae and meninges (protective membranes) around it. The cerebrospinal fluid fills the spaces between these meninges and acts as a cushion thereby protecting the spinal cord and also the brain.

Q. 3. Explain why brain and spinal cord are considered as central nervous system.

Answer: The brain and spinal cord are considered as central nervous system because CNS is located centrally where the brain is housed in the cranium and spinal cord in the vertebral column. Both, the brain and spinal cord are covered by meninges and surrounded by cerebrospinal fluid. The brain and spinal cord are the integrating and control centres therefore they are considered as central nervous system.

Q. 4. Which part of the brain controls the body temperature and blood pressure?

Answer: Hypothalamus, found in the diencephalon part of the brain, maintains homeostasis by regulating the body temperature, blood pressure and heart rate. It is the master control of the autonomic system. It also regulates secretion of hormones from the pituitary gland, hunger, thirst, body weight, sleep etc.

Q. 5. Name the hormone that controls the basal metabolism and its source gland.

Answer: The hormone that controls the basal metabolism is thyroxine. It's source gland is the thyroid gland. Thyroxine also brings about balanced growth, improves oxygen uptake, increases heart rate, regulates body temperature etc.

Q. 6. Name a structure associated with nervous system which is integrated with endocrine system and also secretes hormones.

Answer: Hypothalamus of the nervous system is integrated with endocrine system via the pituitary gland. It sends signals to pituitary glands if any condition needs to be corrected. The

hypothalamus itself acts as an endocrine organ by releasing the hormones ADH and oxytocin into circulation at neurohypophysis. Hypothalamus contains autonomic centres which have direct control over the adrenal gland.

Q. 7. Name the hormone that controls the water and electrolyte balance in the body and its source glands.

Answer: The hormone that controls the water balance in the body is anti-diuretic hormone (ADH). The hormone is synthesized by hypothalamus and secreted by the posterior pituitary.

The hormone that controls the electrolyte balance in the body is Aldosterone. It acts to regulate sodium levels inside the body by increasing active reabsorption of sodium. It is synthesized by zona glomerulosa cells of adrenal cortex in adrenal gland.

Both the hormones, ADH and Aldosterone increase reabsorption of water in kidney.

Q. 8. Why do stem and root show unilateral growth towards light and gravity of earth respectively?

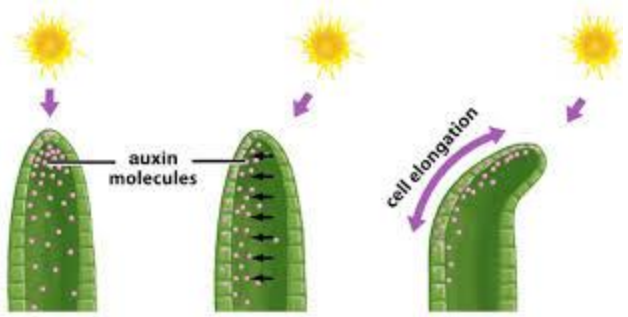
Answer: Plant stems are positively phototropic while plant roots are negatively phototropic. Plant stems are negatively geotropic while plant roots are positively geotropic. Therefore, stem and root show unilateral growth towards light and gravity of earth respectively. The growth hormone like auxin, plays a major role in bringing such tropic movements. When a plant receives light, auxin in stem cause cell elongation and therefore stem grows upwards toward light. In the root, auxin build up in the cells of upper surface of root that induces re-orientation of the cell walls and the root grows downwards i.e., towards earth.

Q. 9. What are auxins and where are they synthesised in the plant body?

Answer: Auxins are the plant growth hormones that control the growing parts of the plant, stimulate cell elongation, differentiation of xylem and phloem, fruit development, apical dominance etc. They are synthesized at the tips of roots and shoot in the plant body. Auxin also influence plant responses to phototropism and geotropism.

Q. 10. Give a schematic diagram to explain the effect of auxins in different parts of the plant.

Answer:



Auxins are the plant growth hormones that control the growing parts of the plant, stimulate cell elongation, differentiation of xylem and phloem, fruit development, apical dominance etc.

Auxins influence gibberellins that promote cell elongation and thus increases plant length. They increase the distance between nodes thus spacing the branch points. Auxins control seedling orientation and always move away from light and downward due to gravity. In areas, where auxin is highly concentrated, cell growth is more. Auxin when applied, also stimulate root branching by initiating roots at the cut stem.

Q. 11. Write names of four hormones secreted from pituitary gland and also write their functions.

Answer:

Hormone secreted by pituitary gland	**Function**
Posterior pituitary	
1. Oxytocin	Milk ejection from mammary gland and contraction of smooth muscles of uterus
2. Anti-diuretic hormone	Stimulated water retention in the body
Anterior Pituitary	
3. Luteinizing hormone	Stimulates production of testosterone in men. Induces ovulation and formation of corpus luteum in women.
4. Follicle Stimulating hormone	Growth of ovarian follicles in women and formation of sperm in men.

Q. 12. How do you support the statement that 'pancreas' are the overall controller of the blood glucose level?

Answer: The statement that "Pancreas are the overall controller of the blood glucose level" is correct. The islets of Langerhans in the pancreas monitor the level of blood glucose level. The beta cells of islets of Langerhans produce insulin and release it when the blood glucose levels are high. The release of insulin promotes glucose uptake in cells. The liver also takes up glucose and

stores it as glycogen. When the blood glucose level declines to normal point, the release of insulin is stopped.

The alpha cells of islets of Langerhans produce glucagon and release it when the blood glucose levels are low. The release of glucagon causes the liver to break glycogen and release it as glucose in blood. When the blood glucose level increases to normal point, the release of glucagon is stopped.

Q. 13. How does control and coordination take place in animal body?

Answer: Control and coordination in animal body takes place through the action central nervous system and endocrine system. The nervous system controls all bodily activities and responses. It is made up of central nervous system which comprises the brain and spinal cord, and peripheral nervous system which is made up of nerves leading into and out of the central nervous system. The nervous system works by neurons which transmit information in the form of nerve impulses.

The endocrine system coordinates body activities by means of chemical substances called hormones. These hormones bring growth and development in the body and help to regulate extracellular fluid, metabolism, contraction of cardiac and smooth muscles, glandular secretions etc in the body.

Q. 14. Name the source gland and one major effect of each of the following hormones:

(a) Parathormone
(b) Progesterone

Answer:

	SOURCE GLAND	MAJOR EFFECT
1. Parathormone	Parathyroid gland	Controls the amount of calcium in blood.
2. Progesterone	Ovary	Thickens the uterine lining and inhibits FSH and LH.

Q. 15. Give one example to show how the endocrine system coordinates our body activities.

Answer: The endocrine system coordinates our body activities by means of chemical substances called hormones. For example- Growth Hormone secreted by the pituitary gland stimulates the growth of muscles and bones in body. Adrenaline secreted from the adrenal gland helps the body to fight in emergency situations. Few of its effects on the body are- more energy, increased physical strength, raised blood pressure, releases sugar in the liver etc.

Q. 16. Write the main difference between auxins and cytokinin.

Answer:

Auxins	Cytokinin
It is produced in the stem tip.	It is produced in roots and travel upward in xylem sap.
Promotes cell elongation.	Promote cell division in plant roots and shoots, leaf ageing and enlargement.
Play major role in phototropism, geotropism and hydrotropism.	Moves from roots into shoots and thus signals lateral bud growth.

Q. 17. Few children in your village have complained of swollen necks. More and more children have complained about swollen necks every month. A villager, Hari Singh is superstitious and he thinks that the village is cursed by a 'devil'. Shyam, another villager, who thinks it as a disease which needs consultation with a doctor.

(a) Do you agree with Hari Singh?

(b) What can be the reason behind swollen necks of the young children in the village? How can the problem be overcome?

(c) What social change is required in the village to make it free form blind faith?

(d) What values are shown by Shyam?

Answer: No. Since the case of swollen neck is slowly spreading every month, it seems more likely to be a disease and not any curse.

(b) The reason behind swollen necks of the young children in the village is swelling of the lymph nodes which occurs when there is some infection in the lymph nodes. The condition is called Lymphadenitis and it occurs when the child is suffering rom some respiratory infection or has cold. The problem can be overcome by giving the children antibiotics to fight the infection (if caused by bacteria) and medicines to reduce the swelling.

(c) The villagers need to be educated to make them free from blind faith. They need to understand that they cannot have blind faith in anything that does not have evidence. Education is the only weapon that can make people free from believing in blind faith and superstitions.

(d) Shyam portrays the image of a sensible man who seems to be educated and does not believes in anything that does not have evidence.