Solution

CONTROL AND COORDINATION

Class 10 - Science

1. The examples of involuntary actions are
   i. Breathing by lungs.
   ii. Blinking of eyes.
   iii. Beating of heart.
   iv. Vomiting, salivation.
2. Cretinism is caused by the deficiency of iodine.
3. Two components of central nervous system are
   i. Brain (it is further divided into fore brain, mid brain and hind brain)
   ii. Spinal cord
4. Oxytocin and Vasopressin or ADH secreted by posterior lobe of pituitary.
5. The specialized cells which detect the changes in the environment are called receptors. They are located in our various sense organs, e.g. olfactory receptors (for smell).
6. i. a. Abscisic acid
      - inhibits growth
      - promotes dormancy in seeds and buds.
      - Promotes closing of stomata.

   b. Cytokinin
      - promotes cell division
      - delays aging in leaves
      - promotes fruit growth.

   ii. **Chemotropism -** It is the directional movement or orientation of the plant part in response to chemical stimulus.
7. Pancreas contains special cells called Islets of Langerhans which has alpha cells and beta cells. Alpha cells secrete glucagon which increases blood sugar level whereas beta cells secrete insulin that decreases blood sugar level. Hence we can say pancreas are the overall controller of the blood glucose level.
8. Sensory neurons get activated first as they carry impulses to spinal cord and the spinal cord interprets the impulses to generate motor impulse which is carried by motor neurons to effector organ for response. So motor neurons gets activated next.
9. a. **Pituitary gland**: Hypothalamus present in brain releases hormones that regulate the secretion of pituitary glands. The pituitary gland is a part of **endocrine system which is also known as Master gland** it produces many hormones that travel throughout the body, directing certain processes or stimulating other **glands** to produce other hormones. Its main function is to secrete **hormones** into our bloodstream. These **hormones** can affect other organs and glands, especially **thyroid. It also** stimulates the adrenal **glands** to **secrete** steroid hormones, principally cortisol. growth hormone, which regulates growth, metabolism and body composition.
   b. **Pancreas:** It is part of the digestive system and produces insulin and other important enzymes and hormones that help break down foods. The pancreas has an **endocrine** function because it releases juices directly into the bloodstream, and it has an exocrine function because it releases juices into ducts.
   c. **Adrenal gland:** -The **adrenal glands** (also known as **suprarenal glands**) are endocrine **glands** that produce a variety of hormones They are found above the kidneys. Each **gland** has an outer cortex which produces steroid hormones and an inner medulla. Located at the top of each **kidney**, the adrenal glands produce **hormones** that help the **body** control blood sugar, burn protein and **fat**, react to stressors like a major illness or injury, and regulate blood pressure. Two of the most important adrenal **hormones** are cortisol and aldosterone.
   d. **Testis** The testis are housed in the **scrotum** just behind the penis. The testis is the male gonads — the primary male reproductive organs. They have two, very important functions that are very important to the male reproductive system, they produce gametes, or sperm, and they secrete **hormones**, primarily testosterone.
10. As a result of castration in male, the secondary sexual characters do not appear and sex instinct is suppressed. This shows that the testosterone hormone produced by the testes are responsible for the development of secondary sexual characters in males and also for the sexual behaviour in male cat.
11. Differences between endocrine glands and Exocrine glands

Endocrine glands	Exocrine glands
1) Endocrine glands have no ducts, (ductless glands)	1) They have ducts. (Digestive glands)
2) They secrete chemical substances called hormones.	2) They secrete proteinaceous substances called enzymes.
3) These glands bring about the chemical co-ordination of the body.	3) These glands by their secretion hasten the biochemical reactions of the body.
4) Endocrine glands are complex.	4) Exocrine glands are simple.
5) The important endocrine gland are pituitary, thyroid, parathyroid, adrenals, sex-glands etc.	5) The important exocrine gland are salivary glands, liver, pancreas, sweat glands etc.

12. When a bBright lLight is focussed on eye, receptor cell receives the message and passes on to sensory neuron, then it goes to brain, who reverts the message by motor neuron causing the pupil contraction.
    Bright Light enters the eye →Retina receives the stimuli → signals send to the brain via optic nerve → brain reverts the message via motor nerve → Pupil contracts
13. 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. Nervous system that includes brain, spinal cord along with other peripheral nervous transfer the information for procesisng. The endocrine system releases hormones in response to stimulus to control and co-ordinate the functions.
14. **Plant Movement**
    Tropic movement or tropism
    Directional movement of specific part of plant in response to external stimuli is called **tropism**.
    These movements are very slow.The movement of plant part can be either towards or away from stimulus.
    If the movement of plant is towards stimulus,it is called **positive stimulus**.
    If the movement of plant is away from stimulus,it is called **negative stimulus**.
    1) Phototropism: It is the directional movement of plant part in response to light stimulus.
    If plant part move towards light it is called as **positive phototropism.**
    For Ex:Stem or shoot
    If plant part move away from light it is called as **negative phototropism.**
    For Ex:Roots
    2) Geotropism : It is the response to gravity.
    If the plant part moves in the direction of gravity it is called **positive geotropism**
    For Ex:Roots grow downwards.
    If the plant part moves against the direction of gravity it is called **negative geotropism.**
    For Ex:Stem grows upwards
    3) Chemotropism : Response to chemical stimuli.
    If Plant part move towards chemical stimuli it is **positive chemotropism**
    If plant part move away from chemical stimuli it is **negative chemotropism.**
    4) Hydrotropism : Response to water.
15. i. The brain and the spinal cord constitute the central nervous system (CNS).
    ii. The spinal cord is concerned with spinal reflex actions and the conduction of nerve impulses to and from the brain.
    iii. The spinal cord is enclosed in a bony cage called vertebral column and is surrounded by membranes called meninges which protects it.
    iv. All the nerves of the body together make up the peripheral nervous system. It consists of three types of nerves that are spinal nerves, cranial nerves, and visceral nerves.
    v. The autonomic nervous system (ANS) means a self-governing nervous system. Its function is to control and regulate the functions of the internal organs of our body involuntarily.
16. i. Hormones are the chemical substances that regulate the biological processes in the living organisms.
    Characteristics of Hormones
        a. They are poured directly into the bloodstream in very small amounts and are carried throughout the body by circulatory system.
        b. They act only on the specific target organs.
    ii. a. Testosterone(produced by testes) is the hormone which brings the change in the male during adolescence.
        b. Insulin (decrease blood sugar) and glucagon (increase blood sugar), secreted by pancreas coordinates the sugar level in blood.

17. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: Both A and R are true but R is not the correct explanation of A.

18. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Plant hormones are chemical compounds produced naturally in plants that control the growth and other physiological functions at a site far away from the place of secretion and required in a very small amounts. It can have to promote or inhibiting effects on a process and hence, it is a growth regulator.

19. **(c)** A is true but R is false.
Explanation: Nerve impulses are always transmitted across a synapse from the axon terminals of one neuron to the dendrite/cell body of the next neuron but never in the reverse direction. Since the neurotransmitter is present only in the axon terminals and not in the dendrite or cell body, it cannot be released from the dendrite or cell body even if the impulse reaches there.

20. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Abscisic acid is responsible for wilting of leaves because it is a growth inhibitor.

21. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Both A and R are true and R is the correct explanation of A.