

**Chapter 20: Control & Co-ordination in Plants  
& Animals**

**B20**

**1. What is irritability?**

Irritability is the unique property of all living organisms to respond to changes in the environment.

**2. Give an example of irritability.**

If an earthworm is touched, it moves away from the place. Plants grow towards the light.

**3. What are plant hormones?**

The special chemicals which bring about coordination in plants are called plant hormones.

**4. What is meant by tropism?**

The movement of plants in response to various stimuli is called tropism.

**5. Define the following.**

a) **Phototropism** – The response of plants towards light

b) **Geotropism** – The response of plants towards gravity

c) **Hydrotropism** – The response of plants towards water

d) **Thigmotropism** – The response of plants towards touch

e) **Thermotropism** – The response of plants towards temperature/heat

f) **Chemotropism** – The response of plants towards chemicals

**6. Give reason: Response in plants cannot be observed immediately**

Response in plants is very slow. Hence it cannot be observed immediately.

**7. Give examples show that not all responses in plants are slow.**

Insectivorous plants like Venus fly trap responds very quickly to touch.

The leaflets of touch me not plant (Mimosa Pudica) get folded immediately on touching.

**8. What are phytohormones? Give example.**

Plant hormones are also called phytohormones. They are organic compounds which are produced by tissues that regulate plant growth and development.

**9. Give reason: Phytohormones are also called growth regulators.**

Phytohormones are organic compounds which regulate plant growth and development in plants. Hence they are called growth regulators also.

**10. Mention the types of growth regulators and give example.**

a) Plant growth promoters ex: Auxins, Gibberellins, cytokinins

b) Plant growth inhibitors ex: Abscisic acid, Ethylene

**11. Mention the functions of plant growth regulators.**

Plant growth regulators promote cell division, cell enlargement/elongation and cell differentiation.

They induce phototropic movement of shoot system.

**12. Mention the two methods of co-ordination of organ system in multi-cellular organisms.**

Co-ordination of various organ systems in multi-cellular organisms is brought about in two ways

- a) Control by nervous system
- b) Control by endocrine system

**13. Mention the two ways of transferring information from one part of the body to another.**

- a) Sending chemical signals through the blood
- b) Sending electrical signals through the nerves.

**14. What is a gland? Which are the two types of glands in our body?**

A gland is an organ made up of cells which are specialised for secretion of particular chemical substances.

The two types of glands are glands with ducts (exocrine glands) and glands without ducts (endocrine glands).

**15. What are exocrine glands? Give example.**

The glands that discharge their secretions through the ducts to their target organs are called exocrine glands. Ex: Salivary gland, pancreas.

**16. What are endocrine glands? Give example.**

The glands that discharge their secretions directly into blood stream are called endocrine glands. Example: Pituitary gland, Thyroid gland

**17. Differentiate between exocrine and endocrine glands.**

| Exocrine glands                                    | Endocrine glands                            |
|--|---|
| They have ducts                                    | They do not have ducts                      |
| The secretions pass through ducts to target organs | The secretions pour directly into the blood |
| They secrete enzymes                               | They secrete hormones                       |

**18. What are hormones?**

The chemical substances secreted by endocrine glands for the control and co-ordination of various activities of the body are called hormones.

**19. What are target organs?**

The organs on which the hormones act, control or co-ordinate are called target organs.

**20. Why are hormones called chemical messengers?**

Hormones are chemical substances that carry stimuli from one part of the body to another.

**21. Name the major endocrine glands.**

a) Pituitary gland b) Thyroid gland c) Parathyroid gland d) Adrenal gland e) Islets of Langerhans f) Gonads

**22. Where is pituitary gland located? Write its functions.**

Pituitary gland is a tiny gland situated at the base of the brain. The functions of pituitary gland are:

- 1) It influences the rate of both physical and mental growth of the body.
- 2) It controls and regulates the production of hormones in other glands.
  - a) stimulates the secretion of hormones from thyroid gland.
  - b) regulates the secretion of hormones from adrenal gland.
  - c) controls the synthesis of melanin in the skin
  - c) stimulates secretion of milk from mammary gland.
  - d) excretion of water from the kidneys.
  - e) contraction of muscles of uterus.
  - f) It stimulates the production of gametes from gonads (ovary and testis)
  - g) It stimulates the secretion of sex hormones by the gonads.

**23. Mention the hormones secreted by pituitary gland and state their function.**

| Name of hormone                           | Short form | Function  |
|---|------------|---|
| Growth hormone or (Somato Tropic Hormone) | STH        | Regulates both physical and mental growth   |
| Thyroid Stimulating Hormone               | TSH        | Stimulates the secretion of hormone from thyroid gland  |
| Adreno Cortico Tropic Hormone             | ACTH       | Regulates the secretion of hormones from adrenal gland  |
| Melanocyte Stimulating Hormone            | MSH        | Controls the synthesis of melanin in skin   |
| Prolaction                                | -          | Stimulates the secretion of milk from mammary glands  |
| Vasopressin                               | -          | Controls the excretion of water from kidneys  |
| Oxytocin                                  | -          | Stimulates the constriction of uterus muscles during child birth.<br>Stimulates the ejection of milk from mammary gland |
| Follicle Stimulation Hormone              | FSH        | Stimulates the production of gametes from gonads  |
| Leutinising Hormone                       | LH         | Stimulates the secretion of sex hormones by the gonads  |

**24. Which hormone is called growth hormone?**

Somato Tropic Hormone is called growth hormone.

**25. Why is pituitary hormone referred to as 'growth hormone'?**

Somato Trophic Hormone which is secreted by pituitary gland regulates both physical and mental growth. Hence it is called as growth hormone.

**26. Why is oxytocin call 'Birth hormone'?**

Oxytocin stimulates the constriction of uterus muscles during child birth and ejection of milk form mammary glands. Hence it is referred to as Birth hormone.

**27. Why is pituitary gland called 'The conductor of endocrine orchestra'?**

Pituitary gland secretes many hormones which control the functioning of other endocrine glands like thyroid gland, adrenal gland, gonads etc. Hence pituitary gland is called the conductor of endocrine orchestra.

**28. What is gigantism?**

Gigantism is a condition of the body in which the growth rate is very high due to the over secretion of growth hormone prior to puberty.

**29. What is dwarfism?**

Dwarfism is a condition of the body in which there is retarded growth due to the under secretion of growth hormone prior to puberty.

**30. What is acromegaly? What are its symptoms?**

The disease caused in adults due to over secretion of growth hormone is called acromegaly. The symptoms are disproportionate growth of bones particularly jaws, nose, hands and legs.

**31. What is Diabetes incipidus?**

Diabetes incipidus is a disease caused due to the low secretion of Anti Diuretic Hormone (ADH) in the body. In this disease, the person passes large quantity of dilute urine

**32. Give reason: Person suffering from diabetes incipidus pass large quantity of dilute urine.**

Since reabsorption of water in the kidneys has decreased

**33. Where is thyroid gland located? Name the hormone secreted.**

Thyroid gland is located close to the throat region, below the pharynx in front of the trachea. Thyroid gland secretes a hormone called thyroxin.

**34. Write the composition of thyroxin.**

Thyroxin is composed of amino acid and iodine.

**35. Mention the functions of thyroxin.**

- a) Thyroxin influences the rate of metabolism.
- b) It increases the production of heat in the body.
- c) It promotes mental and physical development of the body.

**36. Why is thyroxin referred to as 'Personality hormone'?**

Thyroxin indirectly affects the growth and development of body. Hence it is called personality hormone.

**37. What is hypothyroidism? Mention the abnormalities caused due to it.**

Hypothyroidism is a condition in which the thyroid gland fails to produce enough thyroxin to meet the normal requirements of the body.

Hypothyroidism leads to simple goitre, myxoedema and cretinism.

**38. What is simple goitre? What are its symptoms?**

The disease caused due to deficiency of iodine in the food is called goitre. The symptoms of goitre are abnormal enlargement of thyroid gland in the neck region.

**39. How can goitre be prevented or cured?**

Goitre can be prevented by providing sufficient iodine along with food and water. Using iodized salt while cooking food can prevent goitre.

**40. Why do people living in coastal regions do not suffer from goitre?**

People living in coastal regions do not suffer from goitre as they use sea water and sea food which are rich in iodine.

**41. Why is goitre called 'endemic disease'?**

Goitre is a localised disease and found in areas where iodine is less in soil and water. Hence goitre is referred to as endemic disease.

**42. What is cretinism? What are its symptoms?**

Cretinism is a disorder caused in children due to improper functioning of thyroid gland. The symptoms are stunted growth, retarded mental development, bow legs, defective teeth, protrusion of tongue and loose wrinkled skin.

**43. A child is mentally retarded with defective teeth and loose wrinkled skin.**

**a) From which disease is the child suffering? b) What is the disease due to?**

The child is suffering from cretinism. The disease is caused in children due to improper functioning of thyroid gland.

**44. What is myxoedema? What are its symptoms?**

Myxoedema is a disorder caused due to under secretion of thyroxin in adults.

The symptoms are low metabolic rate, loss of mental and physical vigour, thickening of skin, low rate of heart beat.

**45. What is hyperthyroidism? What are its symptoms?**

The disorder caused due to over secretion of thyroxin is called hyperthyroidism. The symptoms are high metabolic rate, protrusion of eye balls, high blood pressure, nervous tension, irritability, profuse sweating, weight loss and fatigue.

**46. Where are parathyroid glands located? Mention the hormone secreted. Mention the disorder caused due to its under secretion and over secretion. State its function.**

Parathyroid glands are embedded in the tissues of thyroid gland.

Parathyroid gland secreted a hormone called parathormone. The function of parathormone is to control the amount of calcium salts in blood and bones.

Under secretion of parathormone leads to painful muscle cramps. Over secretion of parathormone removes calcium from the bones making them soft and spongy.

**47. Why is pancreas considered as 'mixed heterocrine gland'?**

Pancreas is a mixed heterocrine gland because a portion of pancreas functions as an exocrine gland and another portion functions as endocrine gland.

**48. What are islets of Langerhans?**

The cells of endocrine gland of pancreas are called islets of Langerhans.

**49. Mention the hormones secreted by islets of Langerhans. State their function.**

The hormones secreted by islets of Langerhans are insulin and glucagon.

The functions are:

Insulin promotes the conversion of glucose to glycogen for storage in liver and muscles. It is secreted when blood glucose levels are high.

Glucagon influences the conversion of glycogen into glucose. It is secreted when blood glucose levels are low.

**50. What is the role of insulin in regulating the level of glucose in the blood?**

Insulin promotes the conversion of glucose to glycogen for storage in liver and muscles. It is secreted when blood glucose levels are high.

**51. What is diabetes mellitus? What are its symptoms? How can it be controlled?**

Diabetes mellitus is a disorder or condition caused when sufficient insulin is not produced and the glucose level in blood increases which is excreted through urine.

The symptoms of diabetes are frequent urination and thirst.

Diabetes mellitus can be controlled by administering insulin injection of suitable doses.

**52. Differentiate between diabetes mellitus and diabetes insipidus.**

| Diabetes Mellitus                                     | Diabetes Insipidus  |
|---|---|
| It is caused by hypo secretion of insulin in the body | It is caused by hypo secretion of Anti Diuretic Hormone (ADH) in the body |
| The patient passes glucose through urine.             | The patient passes large amounts of dilute urine.                         |
| Blood glucose level is high                           | No increase in blood glucose levels                                       |

**53. Where are the adrenal glands located? Mention the parts of the adrenal gland.**

The adrenal glands are located on the upper part of each kidney. Each adrenal gland has two parts an outer cortex and inner medulla.

**54. Name the hormone secreted by the adrenal cortex. Mention its function.**

One of the important hormones secreted by adrenal cortex is cortisone. It regulates the rate of metabolism and the concentration of salts in the blood.

**55. Mention the hormones secreted by adrenal medulla.**

Adrenal medulla secretes three hormones adrenaline, nor-adrenaline and dopamine.

**56. Mention the functions of adrenaline.**

- a) Adrenaline prepares the body to face emergency by producing adrenaline in excess during fear, anger, anxiety or emotional stress.
- b) It brings about co-ordination in heart beat, respiration and dilation of pupils.

**57. Why is adrenaline referred to as 'emergency hormone'?**

Adrenaline prepares the body to face emergency and brings co-ordination of several events like increased heart beat, rate of respiration, dilation of pupil and other parts of the body. Hence adrenaline is referred to as emergency hormone.

**58. Why is adrenaline also called fright, fight and flight hormone?**

Adrenaline is secreted in excess and prepares the body to face the emergency situations. It helps us to overcome fright (fear), fight or run away (flight). Hence it is called fright, fight or flight hormone.

**59. Assume that you are attacked by robbers as you walk alone. At the moment you start running at a great speed. Which hormone produced in the body is responsible for getting that speed?**

Adrenaline

**60. What are gonads?**

Gonads are the sex glands. Gonads produce sex hormones after the attainment of puberty.

**61. Name the hormones produced by gonads.**

- a) Testis secretes the male sex hormone androgen.
- b) Ovaries secretes the female sex hormone estrogen

**62. Name the hormone secreted by testis. State its function.**

Testis secretes the male sex hormone called androgen. The most common hormone is testosterone. The function of testosterone is to help in the appearance of masculine characteristics at puberty.

**63. Name the hormone secreted by ovaries. State its function.**

The ovaries secrete female sex hormones called estrogens. The function of estrogen is to help in the appearance of feminine characteristics at puberty.

**64. State the function of progesterone.**

Progesterone stimulates the changes in the uterus during menstrual cycle and pregnancy.

**65. Differentiate between Androgens and Estrogens.**

| Androgens                            | Estrogens                               |
|--------------------------------------|---|
| The male hormones produced by testis | The female hormones produced by ovaries |

**66. What is the importance of nervous system?**

- a) Nervous system controls and coordinates various activities and functions of different organs and organ systems in the body.
- b) It regulates both voluntary and involuntary activities of the body.
- c) It enables us to adjust to the environment or situation.
- d) It enables us to think, reason and remember.
- e) It controls all the reflex actions of the body.

**67. What is a neuron?**

A neuron or nerve cell is a special type of cell that is the basic, structural and functional unit of nervous system.

**68. Name the three divisions of the nervous system.**

Nervous system consists of receptors, effectors and conductors.

**69. What are these?**

- a) Receptor: the organ that receives the stimulus is called receptor. Ex: Sense organs
- b) Effector: the organ that shows visible response is called effector. Ex: muscles & glands
- c) Conductors: The tissues that transmit nerve impulses from all the parts of the body to nerve centres are called conductors. Ex: nerves

**70. Name the three divisions of the human nervous system.**

The human nervous system consists of three components namely

- a) Central Nervous System (CNS)
- b) Peripheral Nervous System (PNS)
- c) Autonomic Nervous System (ANS)

**71. Briefly explain the Central Nervous System.**

- a) The components of the central nervous system are brain and spinal cord.
- b) The brain and the spinal cord are covered by three membranes namely outer **Duramater**, middle **Arachnoid** and the inner **piamater** called meninges.  
The space between the meninges is filled by the cerebro-spinal fluid. This fluid circulates between the brain and the spinal cord.

**72. What are meninges?**

Meninges are the layers of connective tissue that surrounds the brain and spinal cord.

**73. How is the brain protected?**

- a) Meninges act as a cushion against bumps and jolts.
- b) Cerebro-spinal fluid protects from injuries.
- c) Brain is also protected by a bony case called **cranium**.

**74. What is the advantage of Cerebro Spinal Fluid (CSF) to brain and spinal cord?**

- a) CSF protects the brain and spinal cord from injuries
- b) It supplies nutrients to the nervous system.

**75. Name the parts of the human brain.**

Brain is divided into three parts – Fore brain, Mid brain & Hind brain.

**76. Name the major parts of the fore brain.**

The two major parts of the fore brain are cerebrum and Diencephalon.

**77. Briefly explain the cerebrum.**

- a) Cerebrum is the largest part of the brain.
- b) It consists of two equal halves called cerebral hemispheres separated by a groove.
- c) The cerebral hemispheres are internally connected by a sheath of nerve fibres called Corpus callosum.
- d) Each hemisphere has two regions – an outer cortex and an inner medulla.
- e) The outer portion (cortex) contains cytons (cell body of neurons) which forms the grey matter. The grey matter is folded into ridges to form convolutions.
- f) The inner portion (medulla) of the cerebrum consists of white matter which contains axons of the neurons.

**78. What are convolutions?**

The surface of cerebrum has a number of folds and ridges called convolutions.

**79. What makes the cerebrum to have larger surface area?**

The surface of cerebrum has a number of folds and ridges which allows the cerebrum to have a larger surface area.

**80. Write the functions of cerebrum.**

- a) Cerebrum is the seat of consciousness.
- b) Cerebrum has centres for intelligence, imagination, reasoning, emotions and will power.

**81. Why is cerebrum called seat of consciousness?**

Cerebrum has centres for intelligence, imagination, reasoning, emotions, will power etc. which takes place when a person is consciousness. Hence it is called as the seat of consciousness.

**82. “An injury to the left cerebral hemisphere may result in paralysis of organs on the right side”. Give reason.**

The nerves coming from the right side of the body are connected to the left cerebral hemisphere.

**83. What is diencephalon?**

The parts of the brain that is below the cerebrum are together called diencephalon.

**84. Name the two parts of the diencephalon.**

The two major parts of the diencephalon are a) the upper thalamus b) the lower hypothalamus.

**85. State the function of thalamus.**

The function of thalamus is to receive nerve impulse from the sense organs and send them to the upper region.

**86. State the function of hypothalamus.**

- a) Hypothalamus regulates body temperature, water balance, appetite and sleep.
- b) It controls autonomic nervous system.
- c) It forms a part of the pituitary gland.

**87. Write a note on mid brain.**

- a) Mid brain is a small region of the brain made up of nerve fibres connecting cerebrum and cerebellum.
- b) It serves as a relay station for nerve impulses from hind brain to fore brain.

**88. Name the parts of the Hind brain.**

The three main parts of the hind brain are:

- a) Pons Varoli    b) Cerebellum            c) Medulla Oblongata

**89. What is cerebellum? Write its function.**

Cerebellum is a small region located between pons and medulla oblongata.

The functions of cerebellum are:

- a) It is responsible for the maintenance of equilibrium and posture of the body.
- b) It co-ordinates and controls the movement of muscles in actions like walking or running.

**90. Give reason: A drunkard walks unsteadily.**

The alcohol affects the cerebellum which is responsible for maintaining balance of the body. It is not able to control and coordinate the movement of muscles while walking.

**91. What are pons? Write their function.**

Pons form the middle part of the hind brain. It acts as a conducting medium carrying impulse from one hemisphere of cerebellum to the other. Out of the 12 pairs of cranial nerves that arise from the brain, 4 pairs originate from the pons.

The functions of pons are:

- a) It has controlling centres of mastication (chewing), facial expressions, and respiration.
- b) It forms the conducting pathway.

**92. What is medulla oblongata? State its function.**

Medulla oblongata is the region that is located at the base of the brain. It continues as the spinal cord.

The functions of medulla oblongata are:

- a) It has centres that control the involuntary activities such as breathing, heart beat, movement of digestive tract (swallowing, coughing, vomiting),
- b) It is also involved in the secretion of enzymes
- c) It maintains blood pressure.

| Part of Brain     | Function   |
|-------------------|--|
| Cerebrum          | <ul style="list-style-type: none"> <li>• Centre of consciousness, thought, imagination, memory, analytical thinking.</li> <li>• Awareness of vision, hearing, smell, taste, touch, heat etc.</li> <li>• Control of voluntary actions.</li> </ul> |
| Cerebellum        | <ul style="list-style-type: none"> <li>• Maintains balance and equilibrium of body.</li> <li>• Coordinates muscular activities.</li> </ul>   |
| Medulla oblongata | <ul style="list-style-type: none"> <li>• Controls heart beat, breathing, contraction of blood vessels, gastrointestinal movements, vomiting, sneezing, coughing and other involuntary activities.</li> </ul>                                     |
| Thalamus          | <ul style="list-style-type: none"> <li>• Relays transmission of impulses to the cerebrum and</li> </ul>  |

|              |  |
|--------------|--|
|              | from the cerebrum.   |
| Hypothalamus | <ul style="list-style-type: none"> <li>• Regulates the body temperature, water level etc.</li> <li>• Centre of thirst, hunger, sexual drive etc.</li> <li>• Controls the secretion of pituitary hormones.</li> </ul> |
| Pons         | <ul style="list-style-type: none"> <li>• Controls mastication, facial expression, respiration. It forms a conducting pathway.</li> </ul>   |

**93. Describe the structure of the spinal cord.**

- a) Spinal cord is a part of the central nervous system.
- b) It is a downward continuation of the medulla oblongata.
- c) It is a long cylindrical structure protected by the vertebral column.
- d) It is composed of large number of nerve cells and nerve fibres.
- e) It has grey matter in the centre surrounded by white matter.
- f) 31 pairs of nerves arise from the spinal cord and their branches reach several parts like heart, lungs, stomach etc.,.
- g) The spinal nerves are made up of both sensory and motor nerve fibres.

**94. State the function of spinal cord.**

Spinal cord co-ordinates the movements of limbs and organs in the body by reflex action.

**95. What is reflex action? Which is the centre of such action?**

Reflex action is an automatic response to an external stimulus. The centre of reflex action is spinal cord. The actions are independent of the brain.

Ex: a) when we touch a hot object, we withdraw our hand

b) When we step on a thorn unknowingly we withdraw our leg.

**96. What is reflex arc?**

The pathway of the nerve impulse involved in reflex action is called reflex-arc.

**97. Mention the parts of a reflex arc.**

The five distinct parts of a reflex arc are:

- a) A receptor to receive stimulus (sense organs)
- b) Sensory neurons to conduct the impulses from receptors to the spinal cord or the hind brain.
- c) An association neuron to transmit the impulse from sensory neuron to a motor neuron.
- d) A motor neuron to pass the impulse to an effector.
- e) An effector to take necessary action in response to the stimulus.

**98. Show the pathway of a typical reflex action.**

Stimulus → receptor → sensory neuron → Association neuron → motor neuron → effector.

**99. Distinguish between sensory nerves and motor nerves.**

| Sensory nerves | Motor nerves |
|----------------|--------------|
|----------------|--------------|



**108. What are lacrymal glands or tear glands?**

Lacrymal glands are the glands present in the outer region of the upper eye lid. It produces secretions that keeps the surface of the eyes moist and wash out dust when we blink.

**109. Describe the structure of eye.**

- a) The wall of the eye is made up of three layers namely outer **sclera**, the middle **choroid** and the inner **retina**.
- b) The sclerotic layer has a bulged, transparent portion called **cornea**. Cornea is protected by a thin membrane called **conjunctiva**.
- c) The choroid has an opening in the front in the centre called **pupil**. The pupil has tiny muscles arranged radially called **iris**.
- d) A transparent bi-convex lens is located behind the iris. The lens is held in position by ciliary muscles and suspensory ligaments.
- e) The area between the cornea and the lens is filled with a fluid called **aqueous humour**.
- f) The space between the cornea and the lens is filled with a thick fluid called **vitreous humour**.
- g) The inner retina layer contains receptor cells called **rods and cones**.

**110. Give reason: Choroid is thick and rich with blood vessels**

Choroid has a layer of blood vessels which nourishes the back of the eye.

**111. Which are the two fluids present in the eyeball? Mention their functions.**

The area between the cornea and the lens is filled with a fluid called aqueous humour. The space between the cornea and the lens is filled with a thick fluid called vitreous humour.

The fluids help in refraction of light rays and maintain the shape of the eye ball.

**112. What are these?**

- a) Sclera: It is the outermost layer of the eye
- b) Cornea: The bulged transparent front portion of the sclera. It allows light to enter the eyeball.
- c) Conjunctiva: It is a thin membrane that protects the cornea.
- d) Pupil: The tiny hole in the middle of choroid.
- e) Iris: It is a circular contractile diaphragm in front of the crystalline lens. Its function is to control the amount of light entering the eye. It is also responsible for the colour of the eye.
- f) Ciliary muscles: It is a muscle along with suspensory ligament holds the crystalline lens in position. It helps to alter the thickness of the lens, so that the image is clearly focussed on the retina.
- g) Aqueous humour: The fluid that is filled in the area between the cornea and the lens. It helps to maintain the shape of the eye ball & to keep the cornea moist.
- h) Vitreous humour: It is a thick fluid filling the space behind the lens. It helps to maintain the shape of the eyeball. It also helps in focussing the image clearly on the retina.

- i) Rods: The receptor cells that are sensitive to dim light. They cannot distinguish colours.
- j) Cones: The receptor cells that are sensitive to bright light. They can distinguish colours.
- k) Yellow spot (Fovea): The depressed region located opposite to the pupil containing a large number of cones where a clear sharp image is formed.
- l) Optic nerve: The bundle of sensory nerve fibres emerging from the eye ball.
- m) Blind spot: The region on the retina where the optic nerve exits the eye ball where no image is formed. Rods and cones are absent in this region.

**113. Differentiate between yellow spot and blind spot**

| Yellow spot  | Blind spot   |
|--|--|
| It is a region opposite to the eye lens            | It is a region where the optic nerve exits the optic nerve |
| It is a region where a clear sharp image is formed | It is a region where no image is formed                    |
| It has a large number of rods and cones            | It has no sensory cells.                                   |

**114. Differentiate between rods and cones**

| Rods                            | Cones                               |
|---------------------------------|-------------------------------------|
| Rods are sensitive to dim light | Cones are sensitive to bright light |
| Rods cannot distinguish colours | Cones can distinguish colours       |

**115. Explain the functioning of the eye.**

- a) The light ray reflected from the object are focussed on the retina to form the image on the retina
- b) The receptor cells in the region are stimulated by photochemical reactions.
- c) The receptor cells convert the stimulations into electrical impulses. The impulses pass through the optic nerve to the visual centre in the cerebrum.
- d) The impulses are interpreted in the cerebrum, resulting in vision.

**116. How is the human eye able to adjust to near and far objects?**

The human eye is able to adjust to near and far objects by altering the focal length of the lens.

When we see a near by object, the muscles around the lens contract which increase the convexity of the lens.

When we see a distant object, the muscles around the lens relax which decreases the convexity of the lens.

**117. What is meant by accommodation of the eye?**

The ability of the eye lens to see both near by and far away objects clearly is called accommodation of the eye.

**118. Give reason:****a) When we suddenly enter a cinema hall, we will not be able to see any objects.**

Our eyes take some time to adjust to the light in the surroundings. When we are in bright area pupil constricts. It remains same when we enter a cinema hall and takes time to dilate. Hence it takes some time to see objects.

**b) There is no image formation at blind spot.**

Blind spot is a region where the optic nerve exits the eye ball. There are no sensory cells. Hence no image is formed.

**119. Mention the common defects of the eye.**

- a) Myopic or short sight
- b) Hyper-metropia or long sight
- c) Presbyopia
- d) Nyctolopia or night blindness
- e) Cataract

**120. What is myopia? How can it be corrected?**

Myopia is a defect of the eye in which the person can see near by objects but cannot see far off objects clearly. It is caused due to the bulging of the eye ball or elongation of the eye ball.

It can be corrected by using concave lens.

**121. Give reason: A concave lens is used to correct myopia.**

In a myopic eye light falls too short from the retina. A concave lens forces light to fall on the retina. Hence concave lens is used to correct myopia.

**122. What is hyper-metropia? How can it be corrected?**

Hyper-metropia is a defect in which a person can see far off objects clearly but cannot see the near-by objects clearly. It is caused due to the flattening of eye ball.

It can be corrected by using convex lens.

**123. Give reason: A convex lens is used to correct hypermetropia.**

In a hypermetropic eye, light is focused behind the retina. A convex lens will force it to form on the retina. Hence a convex lens is used to correct hypermetropia.

**124. What is Presbyopia?**

Presbyopia is a defect in which a person can see neither near-by nor far off objects clearly. It occurs at old age due to the loss of elasticity of eye lens.

**125. What is cataract?**

Cataract is a disorder of the eye in which the lens of the eye becomes cloudy, causing partial or total blindness.

**126. What is diabetic retinopathy? How can it be prevented?**

Diabetic retinopathy is a disorder of the eye that occurs in people suffering from diabetes. After many years of diabetes, the blood vessels of the retina may leak, close-up or begin to grow. This causes blood to enter the vitreous humour making it opaque.

It can be prevented by early treatment with laser beam.

**127. What is vitrectomy?**

Vitrectomy is a major surgical procedure to treat diabetic retinopathy. In this procedure the blood that has leaked into the vitreous humour is removed and vision is restored.

**128. A person is advised vitrectomy surgery. Which gland which is not functioning properly?**

Islets of Langerhans.

**129. Due to what reason blood from retina would seep into vitreous hormone? What is the treatment for this condition?****130. What is astigmatism? How can it be corrected?**

Astigmatism is a defect in which, a person looking at horizontal or vertical lines appears distorted. It is caused due to the unevenness of the crystalline lens. It can be corrected by using cylindrical lenses.

**131. What is Glaucoma?**

Glaucoma is a disorder of the eye. The eyeball of a person suffering from glaucoma gradually hardens. The person sees flashes of light and coloured rings around the objects. The vision gradually decreases and leads to blindness. It occurs in persons above forty years of age.

**132. A person is not able to identify the colours in the traffic signal. What disease is he suffering from?**

The disease is called colour blindness. It is a genetic disorder in which a person is unable to differentiate colours.

**133. What are the precautions to be taken regarding the care of the eyes?**

- a) Do not strain your eyes by reading in dim light
- b) Avoid reading books during journey on roads.
- c) Avoid very bright light.
- d) Avoid watching television from a short distance.
- e) Avoid working on computers for a long time.
- f) Wash the eyes with cold clean water atleast twice a day.
- g) Consult an eye specialist in case of any problem.

**134. Describe the structure of the human ear.**

- a) The human ear is divided into three parts namely the outer ear, the middle ear and the inner ear.
- b) The outer ear consists of pinna, auditory canal and the tympanum.
- c) Pinna is a cartilagenous organ covered with skin.
- d) Tympanum is an obliquely placed membrane which separates the external ear from the middle ear.
- e) The middle ear consists of three bones namely **malleus, incus and stapes**.
- f) The middle ear is connected to the throat by an air passage called **Eustachian tube**.
- g) The inner ear has two parts namely **utricle** and **sacculus**. The upper part or utricle is connected to semi-circular canals. The lower part or sacculus is connected to cochlea.

- h) Cochlea has delicate structures called organ of corti, which have receptors that join to form the auditory nerve.

**135. a) What is organ of corti?**

**b) Name the liquids that are present in inner ear.**

- a) Cochlea has delicate structures called organ of corti, which have receptors that join to form the auditory nerve.
- b) The entire ear is filled with a fluid called endolymph. The inner ear is surrounded by a fluid called perilymph.

**136. Differentiate between endolymph and perilymph**

| Endolymph                                 | Perilymph                                 |
|---|---|
| It is the fluid which fills the inner ear | It is the fluid that fills the entire ear |

**137. How is the ear protected?**

- a) The auditory canal has hairs at its opening to prevent tiny particles from entering the ear.
- b) The wax secreting cells on the inner lining of the auditory canal produces wax that traps small organisms and dust.

**138. What are these? State their function (if any)**

- a) Pinna: It is a cartilagenous organ covered with skin. It collects sound waves and directs them into the auditory canal.
- b) Tympanum: It is an obliquely placed membrane at the end of the auditory canal. It helps in passing the sound waves from outside to the middle ear.
- c) Eustachian Tube: The air passage that connects the middle ear and the throat is called Eustachian tube. It equalizes the air pressure on either side of the ear drum.
- d) Utriculus: It is the upper part of the inner ear. It is connected to three semi-circular canals. It is concerned with the balance of the body.
- e) Sacculus: It is the lower part of the inner ear. It contains appendages called Cochlea. It also contains a delicate structure called organ of corti which forms the auditory nerve.

**139. What are the cares to be taken of the ear?**

- a) Hardened wax from the auditory canal should not be removed using sharp objects as they damage the eardrum.
- b) Loud noise must be avoided as they damage the eardrum.
- c) Visit a doctor if there is ear ache due to infection.
- d) Use hearing aid if there is a problem in hearing.
- e) Small insects entering the ear can be removed by filling the external ear with salt water.

**140. Give reason:**

- a) A strong blow on the ears is very dangerous.**

As it would damage the semicircular canals and cochlea. This would lead to leakage of fluids and sometimes even death, with ear bleeding.

**b) When there is severe throat infection we normally get ear pain.**

Throat infections affect the middle ear because eustachian tubes connect the middle ears and the throat.

**141. Briefly explain the structure of the human nose.**

The nasal cavity is lined by olfactory epithelium. The upper part of the nasal cavity has receptors of smell. The receptors are connected with the olfactory nerve. The olfactory nerve carries the impulses to the brain.

**142. Briefly explain the sensation of smell.**

The molecules from the substance escapes and are carried by the inhaled air. On reaching the olfactory epithelium, they get dissolved in the mucus and stimulate the receptors. The stimulations are passed through the olfactory nerve to the brain. Here it interprets the impulses and gives the sensation of smell.

**143. Why does food appear relatively tasteless when one has cold or running nose?**

When you put food in your mouth, odour molecules from that food travel through the enter nose and stimulate the olfactory receptor cells at the top of your nasal cavity, If mucus in your nasal passages becomes too thick, air and odor molecules cannot reach the olfactory receptor cells. Thus, the brain receives no signal identifying the odour Hence food eaten appears tasteless.

**144. Explain how a pea or a button which has got into the nasal cavity be removed. OR What is the first aid to be provided to a person who got a pea or a button into the nasal cavity accidentally?**

If a pea or a button gets into the nasal cavity accidentally, give a pinch of snuff to the person. It causes violent sneezing and the foreign body will be thrown out. Visit a doctor if the above method does not work.

**145. Explain the structure of tongue.**

The tongue is covered by a mucus membrane. It has numerous tiny sensory cells called taste buds. Taste buds are composed of a cluster of cells with receptors lying in a small depression on the surface.

**146. Briefly explain the mechanism of taste.**

Food that is eaten mixes with saliva and enters the pores of the taste buds. They chemically stimulate the sensory cells. These cells convert the chemical stimuli into electrical impulses. The electric impulses pass to the brain through the sensory neuron. The brain interprets the impulses as taste.

**147. Mention the location of the following taste.**

| Types of taste | Location (region of the tongue) |
|----------------|---------------------------------|
| Sweetness      | Front                           |
| Salt           | Anterior margin                 |
| Sour           | Sides                           |

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|        |           |
|--------|-----------|
| Bitter | Posterior |
|--------|-----------|

**148. After relay race, Runner-A pours glucose powder into his mouth. Runner-B tastes the glucose slowly with the tip of his tongue. Whom do you think, experiences the sweetness most? Why?**

Runner-B experiences most sweetness because the taste buds of sweetness are distributed in the front.

**149. What structures enable the skin to function as a sense organ?**

Sensory receptors are distributed all over the skin which perceive the stimuli. Touch receptors are located near the surface of the skin. Pressure receptors and pain receptors are located deep inside the skin.

**150. Draw a neat labelled diagram of the vertical section of the human eye.**

**151. Draw a neat diagram of the structure of human ear and label the parts.**

**Fill in the blanks:**

1. In plants coordination is brought about by special chemicals called **plant hormones**.
2. The movement of plants in response to various stimuli is called **tropism**.
3. The response of plants towards light is called **phototropism**.
4. The response of plants towards gravity is called **geotropism**.
5. The response of plants towards water is called **hydrotropism**.
6. The response of plants towards touch is called **Thigmotropism**.
7. The response of plants towards temperature/heat is called **Thermotropism**.
8. The response of plants towards chemicals is called **chemotropism**.

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