Question:1

Match the pairs and explain.

'A'	'B'
1. Growth of pollen tube towards ovule 2. Growth of shoot system 3. Growth of root system 4. Growth towards water	a. Gravitropic movement b. Chemotropic movement c. Phototropic movement d. Growth-irrelevant movement e. Hydrotropic movemen

Solution:

'A'	'B'
1. Growth of pollen tube towards ovule 2. Growth of shoot system 3. Growth of root system 4. Growth towards water	b. Chemotropic movement c. Phototropic movement a. Gravitropic movement e. Hydrotropic movement

Question:2

Complete the paragraph.

The milk was on the stove. Rasika was engrossed watching television. She smelled something burning. She ran towards the kitchen. The milk was boiling over. She held the vessel with her bare hands but, screaming, she let it go at once. This activity was controlled by ..... cells. Special ends of ..... in these cells collected the information, from where it was transferred to the ..... and then towards the terminal end of the ..... The chemicals produced at the terminal end passed through the minute space i.e. ..... . In this way, ... were conducted in the body and the process of ..... was completed by conducting the impulses from ..... to .....

(Nerve, muscle cell, impulse, dendrite, synapse, axon, reflex action, cell body)

Solution:

The milk was on the stove. Rasika was engrossed watching television. She smelled something burning. She ran towards the kitchen. The milk was boiling over. She held the vessel with her bare hands but, screaming, she let it go at once. This activity was controlled by nerve cells. Special ends of dendrites in these cells collected the information, from where it was transferred to the cell body and then towards the terminal end of the axon. The chemicals produced at the terminal end passed through the minute space i.e. synapse. In this way, impulse were conducted in the body and the process of reflex action was completed by conducting the impulses from nerve to muscle cells.

Question:3

Write notes on-

Root pressure, Transpiration, Nerve cell, Human brain, Reflex action

Solution:

a. Root pressure: Root pressure can be defined as a force that helps to drive fluids upward into the water conducting vessels. It is generated as a result of osmotic pressure in the cells of the roots and can be

demonstrated by exudation of fluid when the stem is cut off just above ground. As, the stem is cut off, dops of solution begin to ooze out which is an effect of root pressure. The effect of root pressure is also visible at night and early morning. During this time the rate of evaporation is low, as a result of which water droplets can be seen the around special openings of veins near the tip of leaves of plants.

b. Transpiration is the loss of water in the form of vapours from the leaves of a plant. The rate of transpiration is affected by number of external and internal factors.

Internal factors:

(i) Leaf area: The greater the leaf area the higher will be the water loss due to transpiration.

(ii) Leaf structure: Presence of thick cuticle, wax layer, compact mesophyll cells reduces the rate of transpiration.

(iii) Root-shoot ratio: Low root-shoot ratio decreases rate of transpiration.

External factors:

(i) Atmospheric humidity: The higher the relative humidity lower will be the rate of transpiration.

(ii) Temperature: Rise in the atmospheric temperature increased the rate of transpiration.

(iii) Wind velocity: High wind velocity increases the transpiration rate.

(iv) Water supply: Deficiency of water in soil decreases the rate of transpiration.

Importance of transpiration:

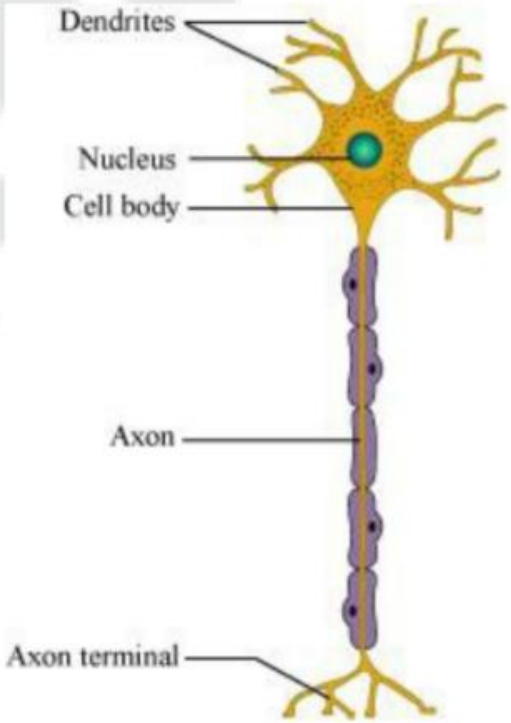
(i) The rate of transpiration affects the rate of absorption of water by the roots.

(ii) Transpiration creates a suction pressure for the upward movement of water in tall trees.

(iii) It helps in the distribution of water throughout a plant.

(iv) Plants get rid of excess water by transpiration. It helps to keep the surface of the leaves cool.

c. Nerve cell- Nerve cells are also known as neurons.



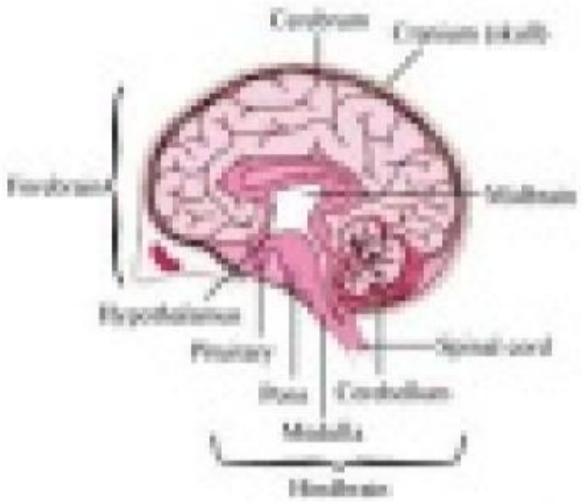
A neuron consists of 3 parts.

(i) Cell body – It contains a nucleus and cytoplasm.

(ii) Axon – It is a long part arising from the cell body. It transmits impulses away from the cell body.

(iii) Dendrites – These are short, branched parts arising from the cell body. They receive the nerve impulses.

d. Human brain-



The human brain is the main coordinating centre of the body. It is a part of the central nervous system and receives information from the other parts of the body and interprets them. The human brain can be divided into three distinct regions.

(i) Forebrain: It consists of cerebrum, thalamus and hypothalamus. The forebrain is the main site of learning, intelligence and thinking. It also has sensory and motor sites which control all the voluntary movements. Hypothalamus is concerned with things like body temperature, urge to eat, drink, etc.

(ii) Midbrain: It consists of regions concerned with the sense of sight, hearing, etc. It also transmits motor impulses to the limbs.

(iii) Hindbrain: It controls most of the involuntary actions like heartbeat, blood pressure, etc. Cerebellum maintains the posture and equilibrium of the body.

e. Reflex action- The automatic action or response provoked by a stimulus is known as reflex action. The sensory nerves that detect the stimulus are connected to nerves that move the muscles. Such a connection is called a reflex arc. The reflex arc connections meet in a bundle in the spinal cord. The signal and the response that has taken place reach the brain but the brain does not coordinate the reflex response. For example, we withdraw our hands on touching any hot article.

Question:4

Name the hormones of the following endocrine glands and the function of each.

Pituitary, Thyroid, Adrenal, Thymus,Testis, Ovary

Solution:

a. Pituitary- The pituitary gland is known as the master gland because it secretes growth hormone and many other hormones which regulate the secretion of many other endocrine glands in the body. Some of the hormones produced by pituitary are:

(i) Prolactin- Growth of mammary glands and formation of milk in them
(ii) TSH- Synthesis and release of thyroid hormones
(iii) Adrenocorticotrophic hormone (ACTH)- Stimulates synthesis and secretion of steroid hormones called glucocorticoids from the adrenal cortex
(iv) Vasopressin- Stimulates reabsorption of water from the distal tubules, and hence, prevents loss of water through urine (diuresis); therefore, also called anti-diuretic hormone (ADH)

b. Thyroid- Thyroid gland secretes the hormone, thyroxine (a derivative of amino acid tyrosine). Functions of thyroxine include:

(i) Control of BMR (Basal metabolism rate)

(ii) Control of working of kidney and urine formation

(iii) Regulation of physical, mental, and sexual growth

(iv) Regulation of growth of CNS and bones

(v) Regulation of carbohydrate and fat metabolism

c. Adrenal- Adrenal gland secretes 3 types of hormones- catecholamines, mineralocorticoids and glucocorticoids.

(i) Catecholamine (adrenaline and nor adrenaline)- They are also known as emergency hormones or hormones of fight or flight.

- Increases alertness, pupilary dilation, piloerection (raising of hair)
- Increases heart beat, respiration rate
- Stimulates the breakdown of glucose, lipids and proteins

(ii) Glucocorticoid: stimulates gluconeogenesis, lipolysis and proteolysis and inhibits uptake and utilisation of amino acids

(iii) Mineralocorticoid: Example – Aldosterone

- Acts on renal tubule and stimulates reabsorption of Na^+ and water
- Stimulates excretion of K^+
- Maintains electrolysis, osmotic pressure and blood pressure
- Androgenic steroids plays a role in the growth of axial, facial and pubic hair during puberty

d. Thymus- Thymus secretes peptide hormone called thymosins. Thymosins play an important role in the differentiation of T-lymphocytes (Cell Mediated Immunity) and promotes production of antibodies (Humoral Immunity). Thymus is degenerated in old people, hence, their immune response becomes weak.

e. Testes- Testis secrete hormones called androgens. Functions of androgens include:

- Development, maturation and functioning of the male accessory sex organs like vas deferens and seminal vesicles
- Stimulate muscular growth, growth of facial hair, low pitch voice, etc.
- Stimulatory role in spermatogenesis
- Act on the CNS and influence male sexual behaviour (libido)
- Anabolism of proteins and carbohydrates

f. Ovary- Ovary **s**ecretes the hormones oestrogen and progesterone.

Functions of oestrogen:

- Growth and functioning of the female secondary sex organs
- Development of growing follicles and mammary glands
- Regulates female secondary sex characters (Examples – high pitch voice)

Functions of progesterone:

- Acts on mammary glands and stimulates formation of alveoli-like structures storing milk
- Milk secretion