Chapter :- Control And Coordination.

- Human body is a complex machine performing tons of functions and processes to maintain and sustain life.
- Living Organisms respond to various stimuli like heat, light, cold, touch, pressure etc.

Movement in Organisms :- The ability of organisms to move certain body parts is movement.

- When they move from one place to another, it is locomotion.

Introduction to Control and Coordination :-

- Organisms move in response to stimuli like light, heat, food etc.
- All the activities in animals are controlled and coordinated by the nervous and endocrine system.
- Hormones are chemical messengers which assist the nervous system in carrying out various functions. They are secreted by endocrine glands.

Nervous System :- Consists of Brain, Spinal network and a huge network of nerves.

Functions :- (i) to recieve information from environment.
(ii) recieve information from various body parts.
(iii) to act accordingly through muscles and glands.

Stimulus :- Any change in environment to which the organism respond is called stimulus. Eg. touching hot plate.

Response :- The reaction of our body to a stimus.
Eg. withdrawal of our hand on touching hot plate.

Coordination :- The working together of various organs of the body of an organism in a proper manner to produce reaction to a stimus, is called coordination.

Receptors:- Specialized tips of some nerve cells that detect the formation from the environment.

Receptors are Sense Organs:-

Photoreceptors (Inner ear)	Photo receptors (Eyes)	Thermoreceptors (Skin)	Olfactory Receptors (Nose)	Gustatory receptors (Tongue).
- Hearing	- Visual Stimulus	- Pain/Touch/ Heat.	- Smell	- Taste

The Nervous System:-

Neuron:- It is the structural and functional unit of nervous system. It is also known as nerve cells, neurons and nerve fibers.

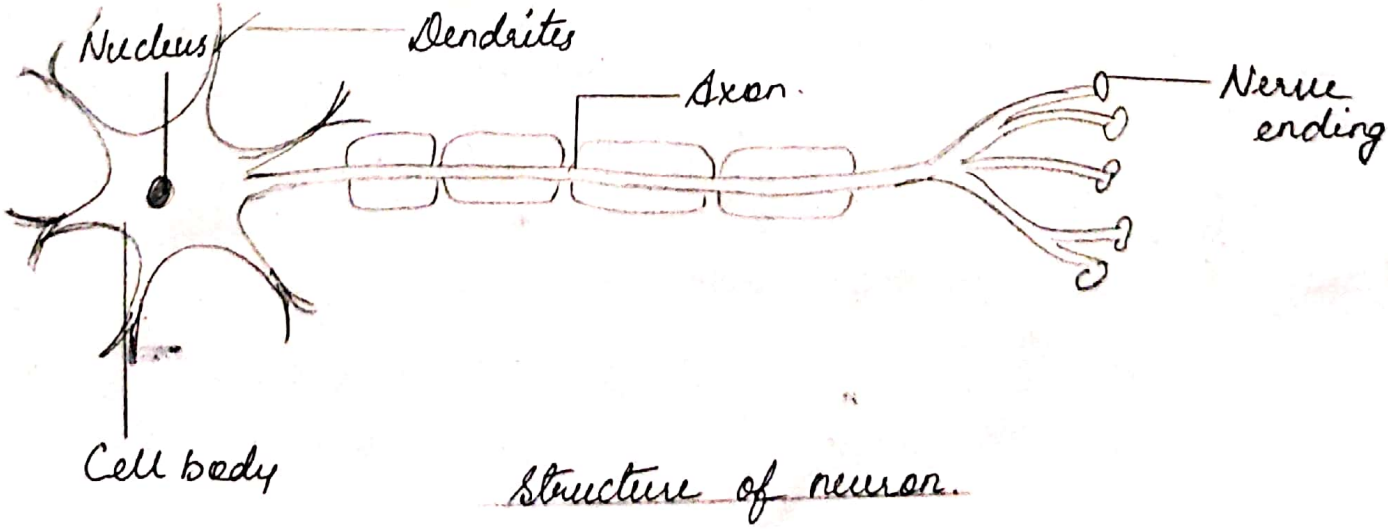
- Electrically excitable cells in the nervous system. Function to process and transmit information.
- Primary components of the neuron are the soma (cell body), axon (long slender projection), dendrites (tree-like structure) that recieves message from other neurons and synapses (specialised junctions between neurons).

Dendrites:- Recieves impulse from other neurons.

Cyton/Soma:- Processes the impulse.

Axon:- Transmit the impulse. Axon may be myelinated or non-myelinated.

Synapse:- The point of contact between the terminal branches of axon of one neuron with the dendrites



Structure of neuron.

Reflex Action :- Reflex action is a sudden, involuntary reaction of the body in response to stimuli. eg. withdrawal of hand, knee jerk etc, on touching hot plate.

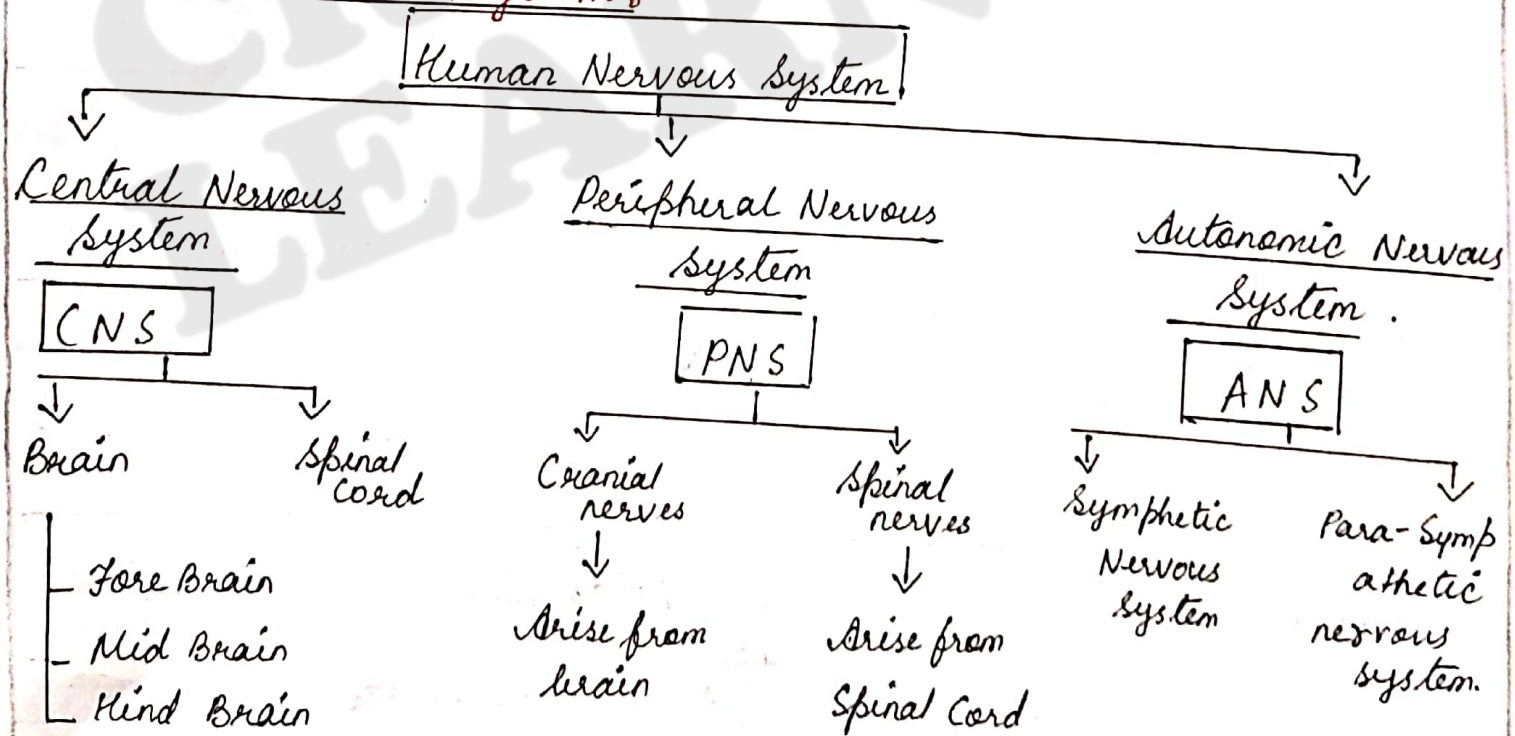
Reflex Arc :- The pathway taken by the nerve impulses in a reflex action is called reflex arc. Receptor organ, sensory / afferent neuron, motor / efferent neuron are components of reflex arc.

Voluntary :- means it is under the control of a person.

Involuntary :- means it is not under the control of a person (eg. heartbeat).

Mechanism of Reflex Action :- A receptor reflex mechanism involves a receptor organ, an effector organ, and some type of communication network. When a sensory receptor is stimulated, signals pass from it along a sensory neuron to spinal cord. The message travels out of the spinal cord along a motor neuron to the effector organ. Additional nerve cells capable of communicating with other parts of the body and present in reflex circuits.

Human Nervous System :-



Human Brain:- It is enclosed in cranium and is protected by cerebrospinal fluid which acts as a shock absorber.

- Human brain has three major parts:-

(a) Fore brain (b) Mid-Brain (c) Hind Brain.

(a) Fore-Brain (Cerebrum):-

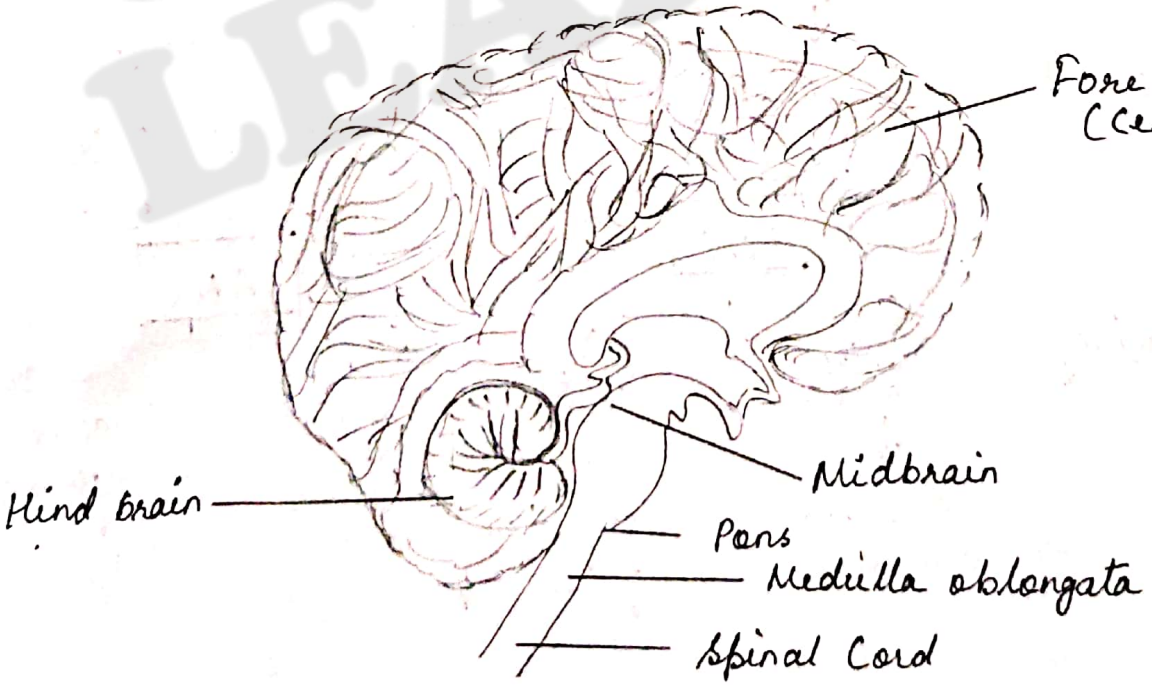
- Most complex / specialized part of brain is Cerebrum.

Functions:- 1. Thinking part of the brain
2. Control voluntary actions.
3. Store information (memory)
4. Centre associated with hunger.
5. Receives sensory impulse from various body parts.

(b) Mid Brain:- It connects the fore-brain with the hind brain. It is the portion of the cranial nervous system associated with vision, hearing, motor control, sleep/wake and temperature etc.

(c) Hind Brain:-

Hind Brain comprises of:- ① Pons
② Cerebellum
③ Medulla Oblangata



Brain:- The human brain is the command center for human nervous system. It recieves input from the sensory organs and send output to the muscles.

- Brain is protected by a fluid called cerebrospinal fluid which acts as shock absorber. It has several layers called Meninges.

Spinal Cord:- Spinal cord is enclosed in Vertebral Column.

Coordination in Plants:-

Hormones are chemical compounds which help to coordinate growth, development and responsibility to the environment.

- **Plant Hormones:-** Main plant hormones are:- Auxin, Gibberellin, Cytokinins, Abscisic acids.

Plant Hormone	Functions
1. Auxin	Helps in growth of plant tissue.
2. Cytokinin	Promotes cell division
3. Gibberelins	Helps in growth of stems, germination, flowering, cell division and plant growth.
4. Abscisic acid	Inhibits growth and causes wilting of leaves, promotes dormancy of buds and seeds.

Growth independent movements:- The movements which are not growth related are called nastic movements. These movements occur in response to environmental stimuli but the response is not dependent on the stimulus. Eg. Touch-me-not plant.

Growth related movements:- The movements which are growth related are called tropic movement. These movements occur in response to environmental stimuli and the direction is dependent on the direction of stimulus.

Hormones In Animals :-

Hormones are the chemical substance secreted by the endocrine glands and transmitted by the blood to the tissue on which it has a specific effect.

Different types of Hormones in Human body :-

1. **Thyroxin** :- Located in the thyroid gland
   - Neck/Throat region
   - Regulation of metabolism of carbohydrates, fats and protiens.
2. **Growth Hormone** :- Located in pituitary Gland
   - Midbrain
   - Regulates growth and development.
3. **Adernaline** :- Located in the Adernal gland
   - Above both Kidneys
   - Regulation of blood pressure, heartbeat etc.
4. **Insulin** :- Located in pancreas.
   - Below Stomach
   - reduce and regulates blood sugar level.
5. **Sex Hormone** :- Testosteron → males → testis
   Oestrogen → females → Ovaries.
   - located in genital/lower abdomen area.
   - Changes associated with puberty. (Sexual maturity)

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