Points to Remember

Characteristic features of living organisms	***Stimulus :*** Changes in environmental condition, detected by receptors in our body. ***Reactions / Responses :*** Relevant changes in the activities of organisms to a particular stimuli. ***Coordination :*** Working together of various organs in a systematic, controlled and efficient way to produce proper response to various stimuli.
Nervous system	It is made up of nervous tissues. **Components of Nervous system :** ***Neurons (or) Nerve cell:*** It is the structural and functional unit of nervous system. ***Neuroglia (or) Glial cells :***. They are non-exciting, supporting cell of the nervous system ***Nerve fibres :*** They are the long slender processes of neurons. i) Myelinated nerve fibre ii) Non-myelinated nerve fibre
Structure of Neuron	**i) Cyton :** Cell body or perikaryon it has neuroplasm (nucleus+cytoplasm) **ii) Dendrites :** Branched cytoplasmic processes that project from the cell body. **iii) Axon :** It is a single, elongated, slender projection.
Transmission of nerve impulse	Stimulus →Receptors in sense organ → Electrical impulse →Dendrite→Cell body or cyton → Axon →Axon end→Neuro transmitter →Synapse → Dentrites of next neuron. Finally the nerve impulse process repeats and finally reaches brain or spinal cord.
Connective tissues	***i) Duramater*** - Outermost thick fibrous membrane ***ii) Arachnoid membrane*** - Middle thin vascular membrane ***iii) Piamater*** - Innermost thin delicate membrane

Human nervous system

1) Central Nervous System (Brain + Spinal cord)

Brain

Forebrain

Cerebrum (Largest portion of brain)	**Structure:** Longitudinally divided into right and left cerebral hemispheres. ❋ **Corpus Callosum:** Connects 2 Cerebral hemisphere ❋ **Cerebral Cortex:** Grey Mattered outer portion of Cerebral hemisphere. (Gyri & Sulci) ❋ **Cerebral Medulla:** White Mattered inner portion of Cerebral hemisphere ❋ **Cerebral Lobes:** Frontal lobe, Parietal lobe, temporal lobe, occipital lobe **Functions:** thinking, intelligence, consciousness, memory, imagination, reasoning, willpower
Thalamus	**Structure:** Present in cerebral medulla. **Function:** Major conducting centre for sensory & motor signaling. Acts as relay centre.
Hypothalamus	**Structure:** It lies at the base of thalamus **Function:** Controls involuntary functions, Controls hormone secretion from anterior pituitary, thermal regulatory center, link between nervous & endocrine system

Midbrain

Stucture: Located between thalamus and hindbrain.

Corpora quadrigemina: 4 rounded bodies of dorsal midbrain that control visual & auditory reflexes.

Hindbrain	
***Cerebellum** (second largest portion of brain)*	**Structure:** Two large sized hemispheres and middle vermis. **Function:** Coordinates voluntary movements and maintains body balance.
Pons	**Structure:** Bridge of nerve fibre that connects the lobes of cerebellum **Function:** Controls respiration and sleep cycle.
Medulla oblongata	**Structure:** Posterior part that connects spinal cord and various parts of brain. **Function:** Controls heartbeat (cardiac centre), respiration (respiratory centre), contraction of blood vessels (vasomotor centres). Regulates vomiting and salivation.

Spinal cord

- Cylindrical structure covered by Meninges in the neural canal of vertebral column.
- **Filum terminale:** Thin fibrous thread like tapering of posterior region of spinal cord.
- **Central Canal:** Cerebrospinal fluid filled cavity
- **Grey matter: ('H' shaped)** Upper end - Posterior horns; Lower end – Anterior horns
- **White matter:** External & have bundle of nerve tracts.
- **Spinal Nerves:** **Dorsal/Afferent root** - Bundle of fibres into Posterior horns;
  Ventral/Efferent root - Bundle of fibres from Anterior horns;

Function: Conducts sensory and motor impulses to & from the brain, controls reflex actions of the body.

2) Peripheral Nervous System (Cranial + Spinal nerves)

Cranial nerves	12 pairs of Nerves arising from brain. Types: **Sensory nerve:** Ex: optic nerve which innervates the eye. **Motor nerve:** Ex: Nerves that innervates eye & iris muscles & tear gland.
Spinal nerves	31 pairs of nerves arising from spinal cord. Each spinal nerve has **Dorsal Sensory root:** Impulse Direction is towards spinal cord **Ventral Motor root:** Impulse direction is away from spinal cord

3) Autonomic or Visceral Nervous System (Sympathetic + Parasympathetic nerves)

- Regulates involuntary functions of visceral organs through **sympathetic & parasympathetic nerves**.
- Enables to perform rapid & specific visceral activities to maintain steady state.

Reflex Action - Any response that occurs automatically without consciousness

Simple or basic	Inbuilt and unlearned responses. **Ex:** winking of eyes when any dust particles enters
Acquired/Conditional	Result of practice and learning. **Ex:** Playing harmonium on seeing a music note.