**LESSON NOTE 4**

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| **THE CENTRAL NERVOUS SYSTEM (CNS)**     * The CNS is the part of the nervous system made up of the **brain** and **spinal cord**. * It is responsible for processing information and controlling most functions of the body and mind. * It works with the peripheral nervous system (PNS) to send and receive messages.   **Main Parts of the CNS**  **The Brain**     * The brain is the most complex organ in the body, located in the skull. * It is divided into three main parts:   + **Cerebrum**:     - Largest part of the brain.     - Controls voluntary actions (walking, writing, speaking).     - Responsible for thinking, learning, emotions, and memory.   + **Cerebellum**:     - Located under the cerebrum at the back of the brain.     - Controls posture, balance, and coordination of movements.   + **Medulla Oblongata**:     - Connects the brain to the spinal cord.     - Controls involuntary activities such as breathing, heartbeat, digestion.   **The Spinal Cord**     * A long, thin, tubular structure running from the brainstem down the back. * Enclosed in the vertebral column (backbone). * Functions:   + Transmits impulses between the brain and the rest of the body.   + Coordinates reflex actions (e.g., knee-jerk response). |

**LESSON NOTE 5**

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| **THE PERIPHERIAL NERVOUS SYSTEM**    * The **Peripheral Nervous System (PNS)** is the part of the nervous system that consists of all the nerves located **outside the brain and spinal cord**. * It connects the CNS to the limbs and organs.  **Components of the PNS**    1. **Cranial Nerves:**    * 12 pairs of nerves originating from the brain.    * Control head and neck functions (e.g., facial movement, vision, smell). 2. **Spinal Nerves:**    * 31 pairs of nerves that emerge from the spinal cord.    * Carry messages between the CNS and the rest of the body.  **Divisions of the PNS** The PNS is divided into two main parts: ****1. Somatic Nervous System (SNS)****  * Controls **voluntary** activities (e.g., movement of skeletal muscles). * Transmits sensory information from receptors to the CNS. * Sends motor commands from the CNS to skeletal muscles.  ****2. Autonomic Nervous System (ANS)****  * Controls **involuntary** activities (e.g., breathing, heartbeat, digestion). * Further divided into:   **a. Sympathetic Nervous System**   * + Prepares the body for "fight or flight" responses (e.g., increases heartbeat, dilates pupils).   **b. Parasympathetic Nervous System**   * + Promotes "rest and digest" responses (e.g., slows heart rate, aids digestion).  **Functions of the PNS**  * Transmits signals between the CNS and the rest of the body. * Controls both voluntary and involuntary body activities. * Allows the body to respond to changes in the internal and external environments. |

**LESSON NOTE 5**

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| **THE STRUCTURE AND FUNCTION OF A NEURONE**     * A **neurone** is a **specialized nerve cell** responsible for **receiving, processing, and transmitting electrical impulses** throughout the body. * Neurones are the basic structural and functional units of the nervous system.   **Structure of a Neurone**   1. **Cell Body (Soma):**    * Contains the nucleus and cytoplasm.    * Controls the activities of the neurone. 2. **Dendrites:**    * Short, branch-like extensions from the cell body.    * Receive signals from other neurones and transmit them to the cell body. 3. **Axon:**    * A long, single extension that carries impulses away from the cell body. 4. **Myelin Sheath:**    * Fatty covering that insulates the axon.    * Speeds up the transmission of nerve impulses. 5. **Node of Ranvier:**    * Gaps between sections of myelin sheath.    * Allow impulses to jump from node to node, increasing transmission speed. 6. **Axon Terminals (Synaptic knobs):**    * Ends of the axon where neurotransmitters are released to pass the impulse to the next cell.   **Types of Neurones**     | **Type** | **Function** | **Direction of Impulse** | | --- | --- | --- | | **Sensory Neurone** | Carries impulses from receptors (sense organs) to the CNS | Sense organ → CNS | | **Motor Neurone** | Carries impulses from the CNS to effectors (muscles/glands) | CNS → Muscles or glands | | **Relay Neurone** | Connects sensory and motor neurones inside the CNS | Within the CNS (acts as a link between the two) | |