In text questions with answers
Extra questions
and
Notes on
HUMAN NERVOUS SYSTEM

1. What is the difference between reflex action and walking?

Ans.

Reflex Action	Walking
1. This is involuntary action	1. This is voluntary action
2. It gives a reaction to stimuli without thought	2. Walking takes place after thought
3. It is controlled by spinal cord	3. It is controlled by brain

2. What happens at the synapse between two neurons?

Ans. Synapse is the gap between nerve ending of one neuron and dendrites of another. At synapse, the electrical impulse generated at dendrites of a neuron is passed on to dendrite of another neuron in the form of chemicals (neurotransmeter) by on ending of the first neuron. Synapse ensures that nerve impulse travels only in one direction. A similar synapse allows the delivery of impulse from the neuron to the other cells, like muscle cells.

3. Which part of the brain maintains posture and equilibrium of the body?

Ans. Cerebellum, which is a part of the hind brain.

4. How do we detect the smell of an agarbatti (incense stick)?

Ans. Smell of an incense stick is detected by the olfactory receptors present in nose and connection of it with the olfactory nerves going through the fore-brain.

5. What is the role of brain in reflex action?

Ans. Spinal cord is made up of nerves which supply information to think about. Thinking involves more complex mechanisms and neural connections. Reflex action is an activity without thought. Reflex action is an involuntary action which is without thought but a signal also goes to brain. So here no direct role of brain is present but brain accounts it.

Extra Questions:

1. Name the unit of nervous system. Draw a neat and clean diagram of it with all the labeling as in your book. Give a brief outline regarding the function of each part.
2. Draw and label (6 labeling at least) a neat and clean diagram of reflex arc and mention how it performs its activity.
3. Draw and label structure of a neat and clean diagram of human brain (10 labelling).
4. Mention the parts of nervous system which controls
    a. Salivation
    b. Change in size of pupil
    c. Sensation of full stomach so not to eat more
    d. Maintenance of posture and balance of body
    e. Memory
    f. Vomiting
    g. Blood pressure
    h. Picking up a pencil

i. Thinking

j. Hearing centre of brain

k. Protection of brain

l. Relay centre of brain

Notes:

(Follow the video classes and NCERT book in detail then go through the notes for key points)

The nervous system or the neural system is a complex network of neurons specialized to carry messages**.** The complexity of the nervous system increases as we move towards higher animals.

For instance, cnidarians such as jellyfish have relatively simple nerve nets spread throughout their body. Crabs have a more complicated nervous system in the form of 2 nerve centers called dorsal ganglion and ventral ganglion.

As we move further up the ladder, higher organisms such as vertebrates have developed the brain. Moreover, it is one of the most complicated structures in the animal kingdom, containing billions of neurons, all intricately connected.

A neuron is the basic unit of the nervous system. Each neuron consists of three parts, namely, the cell body or cyton, branched projections called the dendrites, and the long process from the cell body, called the axon.

Synapse is a gap between two neurons.

Nerves are thread like structures emerging out of the brain and spinal cord. Nerves branch out to all parts of the body and are responsible of carrying messages in the body.

In the human body, the neural system integrates the activities of organs based on the stimuli, which the neurons detect and transmit. They transmit messages in the form of electrical impulses and convey messages to and from the sense organs. Thus, the nervous coordination involves the participation of the sense organs, nerves, spinal cord, and brain.

One of the most complex organ system to ever evolve, the human nervous system consists of two parts, namely:

1. Central Nervous System (consists of the brain and spinal cord)
2. Peripheral Nervous System (includes all the nerves of the body)

Central Nervous System

CNS is often called the central processing unit of the body. It consists of the brain and the spinal cord.

Brain

The brain is one of the important, largest and central organ of the human nervous system. It is the control unit of the nervous system, which helps us in discovering new things, remembering and understanding, making decisions, and a lot more. It is enclosed within the skull, which provides frontal, lateral and dorsal protection. The human brain is composed of three major parts:

1. **Forebrain**: The anterior part of the brain, consists of Cerebrum (Telencephalon), Hypothalamus and Thalamus (Diencephalon).

2. **Midbrain**: The smaller and central part of the brainstem, consists of auditory and visual centres.
3. **Hindbrain**: The central region of the brain, composed of Cerebellum, Medulla and Pons.

Spinal Cord

The spinal cord is a cylindrical bundle of nerve fibers and associated tissues enclosed within the spine and connect all parts of the body to the brain. It begins in continuation with the medulla and extends downwards. It is enclosed in a bony cage called vertebral column and surrounded by membranes called meninges. The spinal cord is concerned with spinal reflex actions and the conduction of nerve impulses to and from the brain.

Peripheral Nervous System

Peripheral Nervous System (PNS) is the lateral part of the nervous system that develops from the central nervous system which connects different parts of the body with the CNS. We carry out both voluntary and involuntary actions with the help of peripheral nerves.

PNS includes two types of nerve fibers:

1. **Afferent nerve fibers** – These are responsible for transmitting messages from tissues and organs to the CNS.
2. **Efferent nerve-fibers** – These are responsible for conveying messages from CNS to the corresponding peripheral organ.

Classification of the peripheral nervous system:

Somatic neural system (SNS): It is the neural system that controls the voluntary actions in the body by transmitting impulses from CNS to skeletal muscle cells. It consists of the somatic nerves.

Autonomic neural system (ANS): The autonomic neural system is involved in involuntary actions like regulation of physiological functions (digestion, respiration, salivation, etc.). It is a self-regulating system which conveys the impulses from the CNS to the smooth muscles and involuntary organs (heart, bladder and pupil). The autonomic neural system can be further divided into:

1. Sympathetic nervous system
2. Parasympathetic nervous system