Answers to exercises in the textbook

Learning Milestone (Page 78)

1. *T* 2. *F* 3. *F* 4. *T* 5. *F*

Check Your Knowledge

A. 1. b) 2. b) 3. d) 4. c) 5. c)

B. 1. nodes of Ranvier 2. 31 3. Dendrites
4. neurotransmitters 5. medulla oblongata 6. peripheral

C. 1. e) 2. c) 3. d) 4. b)
5. a)

D. 1. The system that controls and coordinates the various activities of the body is known as the nervous system. The nervous system communicates through a combination of chemicals and signals through highly specialized cells called the nerve cells, or neurons.

2. Cell body, dendrites, and axon

3. The function of a sensory neuron is to carry impulses from sense organs to the brain or the spinal cord.

4. The function of cerebrospinal fluid is to protect the brain and the spinal cord from shocks and injuries.

5. The following are the functions of the spinal cord:

   a) It transmits messages from the brain to the body parts so that they perform a function.

   b) It coordinates reflex actions.

6. Cranial nerves originate from the brain and spinal nerves originate from the spinal cord.

7. A reflex action is a quick involuntary response to a stimulus. It is sudden and automatic in nature. It is under the control of the spinal cord.

E. 1. A motor neuron is multipolar in structure. Hence it contains a single axon and multiple dendrites, which help a motor neuron to connect many axon terminals of other neurons. Thus it helps in receiving multiple information at the same time.

The motor neuron is located in the spinal cord. It has a long axon, which projects out of the spinal cord to effector organs such as muscles and glands to control them. The point of contact between a motor neuron and a muscle or gland is a specialized synapse called a neuromuscular junction.

The transmission of the impulse or signal happens through the release of a chemical known as a neurotransmitter at the axon terminals.

Note: For a diagram of a motor neuron, refer to fig. 6.1 on page 75 of the textbook.

2. a) Impulse: It is a signal transmitted by neurons.
   b) Stimulus: A stimulus is any change in the external environment that evokes a specific reaction in the body.
   c) Response: The reaction of a body towards a stimulus is called a response.
   d) Receptor: It is a group of cells present at the end of a sensory neuron that generates an impulse on responding to a stimulus.
   e) Effector: It is an organ that reacts on receiving the impulse to produce a response to the stimulus.
3. A reflex arc is a neural pathway followed by a nerve impulse.

   Following are the steps involved in the reflex arc:

   Sensory neuron carries the message from the receptor to the spinal cord.

   ↓

   An interneuron passes the message from the sensory neuron to the motor neuron.

   ↓

   A motor neuron carries the message from the spinal cord to the effector organ.

F.
- Function of sensory neurons: They carry nerve impulses from the sense organs to the spinal cord or the brain.
- Function of motor neurons: They carry nerve impulses from the spinal cord or the brain to the muscles and glands.
- Function of interneurons: They connect sensory neurons with motor neurons to form nerve circuits within specific regions of the brain or the spinal cord.

Analyze This

1. *For a labelled diagram of the brain, refer to figure 6.2 given on page 76 of the textbook.*

   The following are the functions of different parts of the brain.
   - Frontal lobe: Regulates thinking, speaking, memory, and movement
   - Parietal lobe: Controls functions such as perception of touch and understanding language
   - Temporal lobe: Hearing, learning, understanding feelings
   - Occipital lobe: Vision and colour perception
   - Cerebellum: Body posture and balance as well as responsible for learning a new skill like playing an instrument
   - Medulla oblongata: Regulates vital body functions such as breathing, sleeping, and coordinated body movements such as walking and digestion
2. The diagram indicates a motor neuron.

   For a labelled diagram of a motor neuron, refer to figure 6.1 given on page 75 of the textbook.