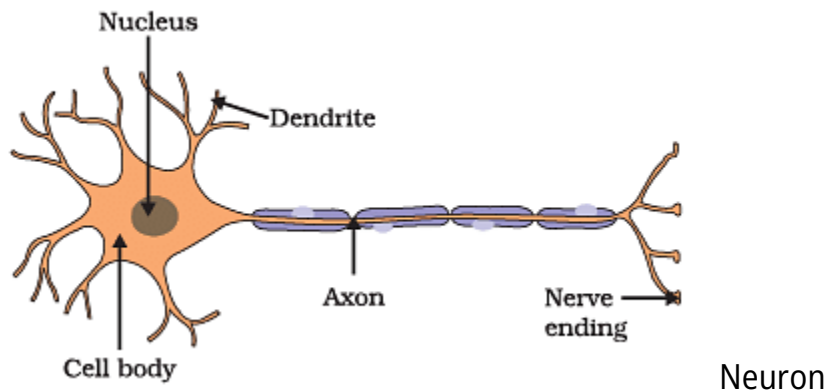


Control and Coordination

Q1: Answer the following questions based on the diagram given below:



(i) What are the three main parts of a neuron?

Ans: A neuron consists of three main parts: the cell body (soma), dendrites, and an axon.

(ii) What is the function of dendrites in a neuron?

Ans: Dendrites receive electrical signals (nerve impulses) from other neurons and transmit them toward the cell body.

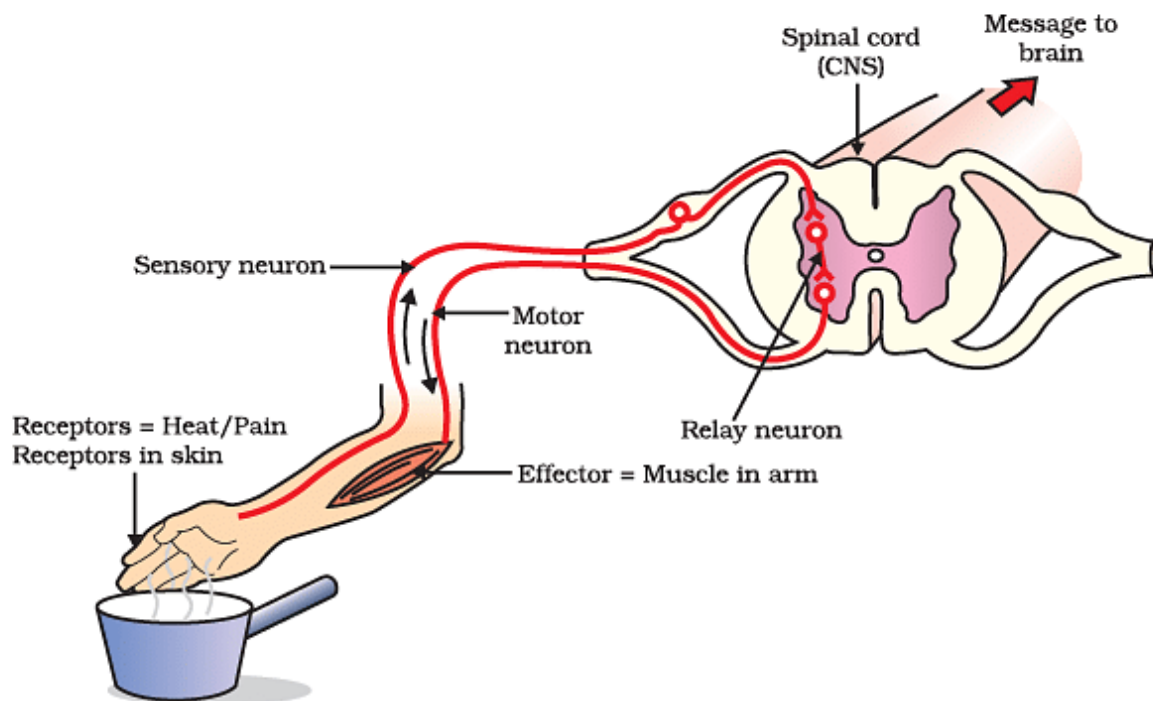
(iii) Explain the role of the axon in a neuron.

Ans: The axon is a long, slender projection of a neuron that carries nerve impulses away from the cell body and transmits them to other neurons or muscle cells.

(iv) How do neurons communicate with each other?

Ans: Neurons communicate with each other through small gaps called synapses. When an electrical signal (nerve impulse) reaches the end of an axon, it triggers the release of neurotransmitters, which carry the signal across the synapse to the dendrites of the next neuron.

Q2: Answer the following questions based on the diagram given below:



Reflex Arc

(i) What is a reflex arc, and why is it important for our body?

Ans: A reflex arc is a neural pathway that controls reflex actions in our body. It allows us to respond quickly to potentially harmful stimuli without conscious thought. Reflex arcs are essential for our safety and protection.

(ii) Describe the main components of a reflex arc.

Ans: A reflex arc consists of five main components:

- Receptor: Detects the stimulus.
- Sensory Neuron: Carries the signal to the spinal cord or brain.
- Integration Center: Processes the signal in the spinal cord or brain.
- Motor Neuron: Carries the response signal from the integration center.
- Effector: Executes the response (e.g., muscle contraction).

(iii) Explain a simple reflex action with an example.

Ans: A simple reflex action is an automatic response to a stimulus. For example, when you touch a hot stove, the heat receptors in your skin detect the high

temperature (receptor). The sensory neuron quickly sends a signal to the spinal cord (sensory neuron). In the spinal cord, the signal is processed, and a response is generated (integration center). The response is to withdraw your hand from the stove, which is carried out by the motor neuron (motor neuron) and the muscles in your arm (effector).

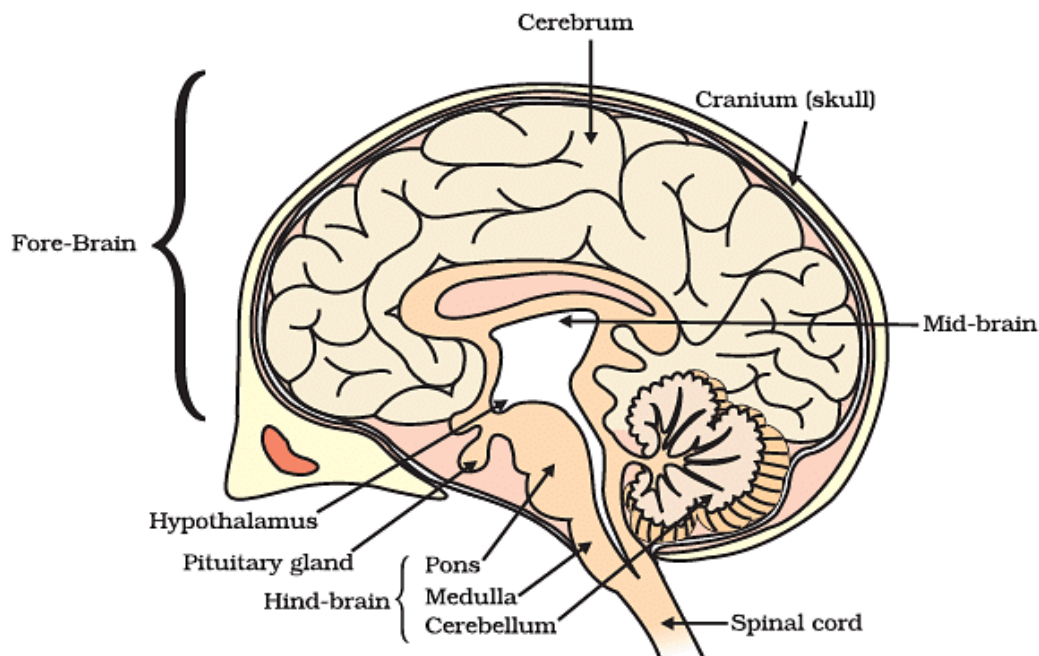
(iv) How does a reflex action differ from a voluntary action?

Ans: A reflex action is an involuntary and automatic response to a stimulus. It occurs rapidly and does not involve conscious thought. In contrast, a voluntary action is a deliberate and conscious movement or decision made by the brain, such as raising your hand to answer a question in class.

(v) Can you explain the role of the spinal cord in a reflex arc?

Ans: The spinal cord plays a crucial role in a reflex arc. It serves as an integration center where the sensory signal is processed and a response is generated. This allows for a quick and automatic response to a stimulus without the need for the signal to travel all the way to the brain. The spinal cord acts as a relay station, facilitating rapid reflex actions for our safety.

Q3: Answer the following questions based on the diagram given below:



Human Brain

(i) What are the main parts of the human brain shown in the diagram, and what are their functions?

Ans: The human brain consists of three main parts: the cerebrum, cerebellum, and brainstem. The cerebrum is responsible for thinking, memory, and voluntary movements. The cerebellum controls balance and coordination, while the brainstem regulates essential functions like breathing and heartbeat.

(ii) Can you identify the two hemispheres of the brain in the diagram? What is the significance of the left and right hemispheres?

Ans: Yes, the diagram shows two hemispheres, the left and right. The left hemisphere is typically associated with language, logic, and analytical thinking. The right hemisphere is linked to creativity, emotions, and spatial awareness.

(iii) In the image, there are several convoluted ridges and grooves on the brain's surface. What are these structures called, and why are they important?

Ans: The convoluted ridges and grooves on the brain's surface are called "gyri" (ridges) and "sulci" (grooves). These structures increase the brain's surface area, allowing for more neurons and a higher processing capacity.

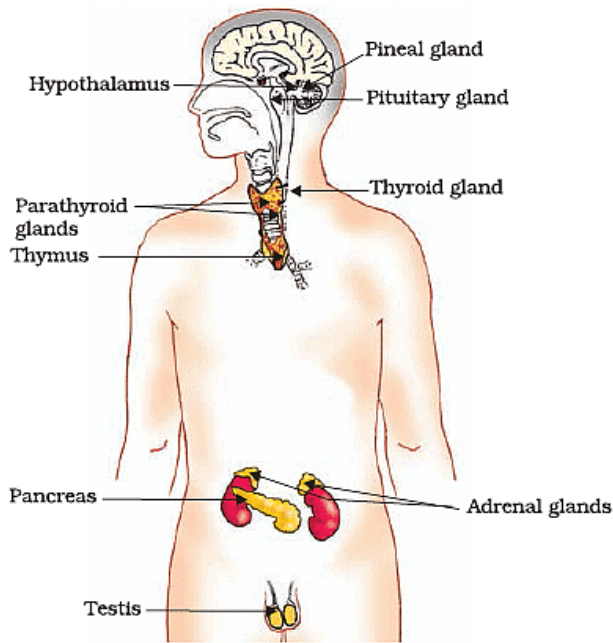
(iv) Locate and describe the role of the hypothalamus in the diagram. What functions are associated with this part of the brain?

Ans: The hypothalamus is located at the base of the brain and helps regulate many important functions, including body temperature, hunger, thirst, and the sleep-wake cycle. It also controls the release of hormones from the pituitary gland.

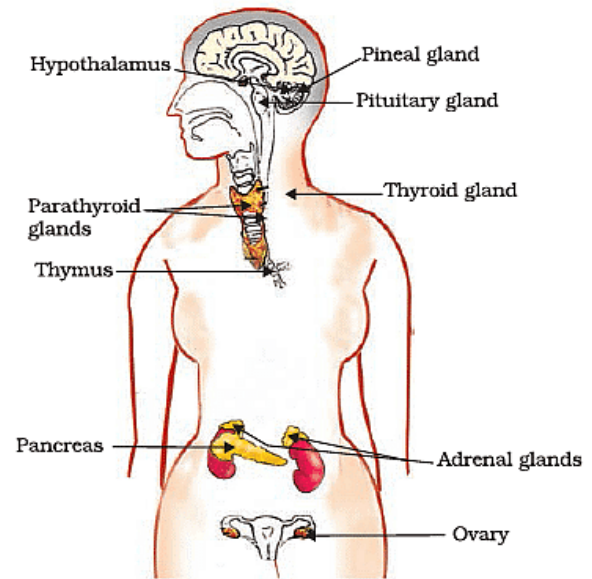
(v) Point out the spinal cord's connection to the brain in the diagram. What is the role of the spinal cord, and how does it relate to the brain's function?

Ans: The spinal cord is connected to the brainstem and extends down the vertebral column. It serves as a relay between the brain and the rest of the body, transmitting signals for movement and sensation. It plays a vital role in reflex actions and the coordination of bodily functions.

Q4: Answer the following questions based on the diagram given below:



(a)



(b)

Endocrine system of Male and Female

(i) What is the primary function of the endocrine glands shown in the diagram for both males and females?

Ans: Endocrine glands are special parts of our body that release hormones. Hormones are chemical messengers that travel through the blood to help control different functions in the body, like how we grow, how our body uses energy, and how we handle stress.

(ii) Identify the endocrine gland labeled in the diagram that is responsible for regulating metabolism.

Ans: The thyroid gland is responsible for regulating metabolism.

(iii) Which endocrine gland in the diagram is unique to males and plays a crucial role in the production of sperm and male secondary sexual characteristics?

Ans: The testes are unique to males and are responsible for sperm production and male secondary sexual characteristics.

(iv) Name the endocrine gland in the diagram that controls blood sugar levels by secreting insulin and glucagon.

Ans: The pancreas controls blood sugar levels by secreting insulin and glucagon.

(v) Identify the endocrine gland in the diagram that is responsible for producing hormones like estrogen and progesterone, important for female secondary sexual characteristics and the menstrual cycle.

Ans: The ovaries produce hormones like estrogen and progesterone, which are important for female secondary sexual characteristics and the menstrual cycle.