

Maharashtra State Board Class 11 Psychology Solutions Chapter 7

Nervous System

1A. Complete the following statements with appropriate options.

Question 1.

Brain is a part of _____ nervous system.

- a. central
- b. peripheral
- c. somatic

Answer:

- a. central

Question 2.

_____ are the building blocks of the nervous system.

- a. Cells
- b. Neurons
- c. Tissues

Answer:

- b. Neurons

Question 3.

_____ nervous system prepares us for the fight or flight responses.

- a. Somatic
- b. Parasympathetic
- c. Sympathetic

Answer:

- c. Sympathetic

Question 4.

The gap between two neurons is called _____

- a. synapse
- b. joint
- c. vacuum

Answer:

- a. synapse

1B. Match the following pairs.

Question 1.

A	B
1. Thyroxin	a. Pituitary
2. Epinephrine	b. Parathyroid
3. Parathormone	c. Thyroid
4. Androgen	d. Adrenal gland
5. Somatotropin hormones	e. Salivary gland
	f. Sex glands

Answer:

A	B
1. Thyroxin	c. Thyroid
2. Epinephrine	d. Adrenal gland
3. Parathormone	b. Parathyroid
4. Androgen	f. Sex glands
5. Somatotropin hormones	a. Pituitary

1C. Identify the odd item following series of words.

Question 1.

The frontal lobe, Parietal lobe, Thalamus, Occipital lobe

Answer:

Thalamus

Question 2.

Dopamine, Serotonin, Norepinephrine, Uric acid, GABA

Answer:

Uric acid

Question 3.

Dendrite, Nucleus, Tectum, Axon, Synapse

Answer:

Tectum

Question 4.

Knee jerk, Sneezing, Thinking, Blinking of eyes

Answer:

Thinking

Question 5.

Thyroid, Sweat glands, Adrenal gland, Gonads, Pituitary gland

Answer:

Sweat glands

1D. Identify which hormones with hyposecretion or hypersecretion would lead to the following conditions.

Question 1.

Abnormal height, gigantism

Answer:

Hypersecretion – Somatotropin

Question 2.

Hyperactivity, speedy metabolism.

Answer:

Hypersecretion – Thyroxin

Question 3.

Cretinism

Answer:

Hyposecretion – Thyroxin

Question 4.

Stunted growth, dwarfism

Answer:

Hyposecretion – Somatotropin

Question 5.

Myxedema, fatigue, sluggishness, depression

Answer:

Hyposecretion – Thyroxin

Question 6.

Increased appetite, overactivity, restlessness, lack of concentration

Answer:

Hyposecretion – Insulin, and glycogen

2. Which part of the brain is involved in processing the following information?

Question 1.

Smelling a flower

Answer:

Occipital lobe

Question 2.

Maintaining balance while standing upright

Answer:

Cerebellum

Question 3.

Comprehending a speech

Answer:

Temporal Lobe

Question 4.

Memorizing a childhood experience

Answer:

Frontal lobe

Question 5.

Feeling touch

Answer:

Parietal lobe

Question 6.

Seeing a picture

Answer:

Occipital lobe

Question 7.

Feeling hungry

Answer:

Hypothalamus

Question 8.

Feeling afraid

Answer:

Amygdala

3. Answer the following questions in 35 to 40 words.

Question 1.

Explain the functions of the hypothalamus.

Answer:

- Hypothalamus controls major bodily needs i.e., primary needs of an individual like hunger, thirst, sex as well as temperature regulation, and sleep.
- It is also called the pleasure center of our body.

Question 2.

Describe the functions of each of the four lobes.

Answer:

- Frontal lobe: It controls motor actions, thinking, memory and reasoning. It has Broca's area which helps in speech production.
- Parietal lobe: It helps in understanding information regarding skin-like touch, pressure, pain, and temperature.
- Occipital lobe: It is the visual processing center. It controls the sense of hearing, smell, and taste. It has Wernicke's area which helps in language understanding.
- Temporal Lobe: Hearing, understanding language, memory for language take place because of the temporal lobe.

Question 3.

Explain the functions of the Amygdala and Hippocampus.

Answer:

- Amygdala: It stores emotional memories of experiences. We experience emotions, especially fear due to the amygdala.
- Hippocampus: It is the storage of long-term memories. If a person gets Alzheimer's disease, his hippocampus is mainly affected.

Question 4.

What is a synapse? How does a nerve impulse travel from one to another neuron?

Answer:

- A synapse is a gap between two neurons.
- The nerve impulse or neural message jumps across the synapse in order to reach the dendrite of another neuron.

- When the neural message is passing through, it excites or inhibits the neurotransmitter in it. This chemical reaction decides our reaction to various situations.

Question 5.

Which are the important parts of the hindbrain? Explain their functions.

Answer:

Important parts of the hindbrain and their functions are as follows:

- Cerebellum: It helps in maintaining body posture and body balance. It also helps in the coordination of the movements.
- Brain stem: Medulla oblongata controls the breathing rate, pulse rate, blood pressure, and digestion. Pons sends and receives information from the lower parts of the brain. It helps to transmit messages between the cerebellum and cortex.
- Reticular activation system: Its main function is to maintain wakefulness, concentration, and alertness.

Question 6.

How do endocrine glands affect our behaviour?

Answer:

- Endocrine glands secrete chemical substances called hormones.
- Hormones are like messengers that are responsible for certain behaviours or the absence of reactions.
- e.g. Thyroid gland secretes the thyroxin hormone. Its hypersecretion leads to Grave's disease while hyposecretion results in cretinism or myxedema.

4. Write short notes.

Question 1.

Autonomic Nervous System

Answer:

- The autonomic nervous system controls the internal activities of the human body including heart rate, breathing, digestion, disposal of waste products, and toxins.
- It is divided into the sympathetic and parasympathetic nervous systems.
- The sympathetic nervous system prepares our body to face stressful and threatening situations. It prepares us for a 'flight or fight' reaction. The job of the system is just opposite to its name.
- The parasympathetic nervous system takes over when the situation becomes normal. It directs our body to store energy for emergencies.

Question 2.

Limbic System

Answer:

One of the important parts of the brain is the limbic system.

- Hippocampus, amygdala, thalamus, and hypothalamus are parts of the limbic system.
- Hippocampus is responsible for the storage of long-term memories.
- Amygdala stores emotional memories of our experiences.
- Thalamus is called a relay station of the brain. It receives all information from the body and sends it to various parts of the brain.
- Hypothalamus controls major bodily needs like hunger, thirst, sex as well as temperature regulation, and sleep.

Question 3.

Neurotransmitters

Answer:

Neurotransmitters are chemical messengers. The important neurotransmitters are:

- Acetylcholine: It is a chemical released by motor neurons of the nervous system to activate muscles.
- Dopamine: It is released by the brain. If the level of dopamine is normal, we experience happy, pleasant feelings. It also plays an important role in the motivational process.
- Norepinephrine: It increases the force of skeletal muscles, especially during fight or flight response.
- Serotonin: It plays a role mainly in cognition, reward, learning, and memory. It also controls wakefulness, sleep, hunger, thirst, and liking.
- Glutamate: It helps in learning, memory, and maintaining sugar levels.
- GABA (Gamma Amino Butyric Acid): It is the chief inhibitory neurotransmitter i.e. its principal role is to reduce the excitability of neurons throughout the nervous system. If it is less, it leads to convulsions and we cannot control body movements.

Question 4.

Pituitary gland

Answer:

- The pituitary gland is one of the endocrine glands, i.e., glands that secrete chemical substances into the bloodstream.
- It is also called as master gland as it helps other glands to produce their secretions and secretes the majority of hormones.
- It consists of the anterior lobe and posterior lobe.
- Anterior lobe: It secretes somatotropin, growth hormone, and adrenocorticotrophic hormone. It helps the growth of the body and aids the adrenal gland. The hormones secreted by this gland are also vital for the nourishment of foetus.
- Hypo or hypersecretion in the anterior lobe: Hyposecretion leads to dwarfism, wherein a person is very short (two-three feet tall). On the other hand, hypersecretion can lead to gigantism, wherein a person becomes very huge and is eight-nine feet tall. Hypersecretion can also result in acromegaly, wherein a person has the features of a chimpanzee.

- Posterior lobe: It secretes oxytocin (which creates a feeling of happiness), pituitrin (which helps smooth muscle functioning of the stomach), thyrotrophic follicle-stimulating luteinizing hormone (which helps in the nourishment of foetus), and endorphins (which help to create neurotransmitters).

5. Compare and contrast

Question 1.

Sympathetic nervous system and Parasympathetic nervous system

Answer:

- The sympathetic nervous system prepares our body to face stressful and threatening situations. It prepares us for a 'flight or fight' reaction. On the other hand, the parasympathetic nervous system takes over when the situation becomes normal,
- Example:
 - Situation: Suppose you are chased by a dog.
 - Sympathetic nervous system: Due to the functioning of this system, your heartbeat and palpitation increase. You also start to sweat.
 - Parasympathetic nervous system: When PNS takes over, your heart rate, palpitation, and sweating become normal. You regain a cool and composed state due to the functioning of this system.

Question 2.

Exocrine glands and Endocrine glands

Answer:

- Exocrine glands directly release their secretions into the organ or tissue while endocrine glands secrete chemical substances into the bloodstream.
- Exocrine glands have separate ducts for their secretion and so, they are also called duct glands, e.g. sweat glands and tear glands. On the other hand, endocrine glands are called ductless glands as they don't have a separate duct. e.g. pituitary gland and thyroid gland.

6. Answer in 150-200 words.

Question 1.

Explain the functions of various parts of the human brain.

Answer:

The brain consists of three major parts, viz. hindbrain, midbrain, and forebrain. Its functions are as follows:

i. Hindbrain

- Cerebellum: It helps in maintaining body posture and balance as well as aids in the coordination of movements.
- Brain stem: Medulla oblongata controls the breathing rate, pulse rate, blood pressure, and digestion. Pons helps to transmit messages between the cerebellum and cortex.
- Reticular activation system: It is the 'Alarm clock' of the body. It maintains wakefulness, concentration, and alertness.

ii. Midbrain: It sends information to the upper part of the brain and controls eye movements.

iii. Forebrain

- Cerebrum: Cerebral cortex controls higher-order mental processes such as attention, perception, learning, memory. The surface of the cerebral cortex is divided into right and left hemispheres. Neurons from the right hemisphere control the left side of the body and vice versa. Left hemisphere controls language, spatial relation, and pattern recognition.
- Four lobes: Frontal lobe controls motor actions, thinking, memory and reasoning. The parietal lobe helps us in understanding information regarding skin. The occipital lobe controls our vision. The temporal lobe is responsible for hearing, understanding language, and memory for language.

Question 2.

Explain the significance of endocrine glands in human behaviour. State the functions of any five endocrine glands in detail.

Answer:

- Endocrine glands secrete vital chemical substances called hormones. There is a strong impact of hormones upon human behavior.
- Hormones are responsible for certain behaviours or the absence of reactions.
- Over (hyper) or under (hypo) secretion of hormones may lead to a variety of problems.
- e.g. Hypersecretion of insulin and glycogen hormones by the pancreas reduces blood sugar levels. It results in hyperglycemia, wherein a person lacks energy and motivation, may faint and go to coma. Conversely, in the case of hyposecretion, a person gets diabetes. He becomes quite hungry and feels very tired and restless. He also shows irritated behaviour and faces frequent and uncontrolled urination.

The functions of the five endocrine glands are as follows:

- Thyroid gland: It secretes thyroxin which maintains the rate of metabolism.
- Parathyroid gland: It secretes parathyroxin which maintains calcium as well as phosphate balance.
- Pancreas: It secretes insulin and glycogen that is responsible for maintaining blood sugar levels.

- Adrenal gland: Cortex secretes cortin or cortisone which maintains the level of water, sugar, and sodium. The medulla secretes adrenalin (which is associated with fear) and noradrenaline (which is associated with anger). Medulla plays important role in emotional excitement.
- Gonads (sex gland): Testes in males secrete androgen and testosterone. These hormones are responsible for secondary sex characteristics in males. Their voice becomes hoarse. They also get mustaches and beards. Ovaries in females secrete estrogen and progesterone. These hormones are responsible for secondary sex characteristics in females. As a result, feminine looks develop and menarche begins.

Activities

Activity 1 (Textbook Page No. 76)

Few activities are given below. Identify the system which dominates during these activities.

1. Picking up an object from the ground
2. Shivering when we sense danger
3. Feeling composed when we feel safe
4. Increase in heart rate when we sense that we are going to meet with an accident

Answer:

1. Central nervous system
2. Sympathetic nervous system
3. Parasympathetic nervous system
4. Sympathetic nervous system

Activity 2 (Textbook Page No. 80)

Think of the following actions. Which of them would be reflex actions and which of them will not be reflex actions?

- Throwing a ball in a cricket match
- Closing the eyes if someone brings a finger too close to them.
- Removing the hand when you accidentally touch a thorn.
- Immediate movement of the knee when tapped just below it.
- Touching a hot object and pulling back your hand.

Answer:

Reflex actions:

- Closing the eyes if someone brings a finger too close to them.
- Removing the hand when you accidentally touch a thorn.
- Immediate movement of the knee when tapped just below it.
- Touching a hot object and pulling back your hand.

Non-reflex actions:

- Throwing a ball in a cricket match