

INDIAN SCHOOL AL WADI AL KABIR



DEPARTMENT OF SCIENCE (2023 –2024)

CLASS: XI	SUBJECT: BIOLOGY	DATE OF COMPLETION: 14/2/2024
WORKSHEET WITH ANSWERS	TOPIC: NEURAL CONTROL AND COORDINATION	NOTE: A4 FILE FORMAT
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

I : 1Mark Questions

1. **One of the functions of the Neuroglial cells is to protect and support**

1. Nephrons
2. Myoid cells
3. Neurons
4. None of the above

2. **The abundant inhibitory neurotransmitter found in the CNS is**

1. Gamma-glutamyltransferase
2. Gamma-linolenic acid
3. Gamma-Aminobutyric acid
4. None of the above

3. **There are ____ laminae present in the spinal cord's grey matter**

1. 2
2. 4
3. 6
4. 10

4. **The thalamus and the hypothalamus are located in the _____**
1. Brain stem
 2. Cerebrum
 3. Cerebellum
 4. Diencephalon
5. **One of the actions of the parasympathetic nervous system is**
1. Inhibits peristalsis
 2. Constriction of Pupils
 3. Dilates Bronchioles
 4. Sweat secretion

II : Assertion and reasoning:

- a) Assertion and Reason are true and Reason is the correct explanation of the Assertion.
- b) Assertion and Reason are true but Reason is not a correct explanation of the Assertion.
- c) Assertion is true but the Reason is false.
- d) Assertion and Reason are false.

Q.6. Assertion: Nerve conduction is the one-way conduction.

Reason: Nerve impulse is transmitted from dendrite terminals to axon terminals.

Q.7. Assertion: The chemical stored in the synaptic vesicles are termed as neurotransmitters.

Reason: Synaptic vesicles release these chemicals in the synaptic cleft.

Q.8. Assertion: The imbalance in concentration of Na^+ , K^+ and proteins generates resting potential.

Reason: To maintain the unequal distribution of Na^+ & K^+ , the neurons use electrical energy.

Q.9. Assertion: Transmission of nerve impulse across a synapse is accomplished by neurotransmitters.

Reason: Transmission across a synapse usually requires neurotransmitters because there is a small space, i.e., synaptic cleft, that separates one neuron from another.

Q.10. Assertion: Electrical synapses are rare in our system.

Reason: Impulse transmission across an electrical synapse is slower than that across a chemical synapse.

2Mark Questions

Q.11. Arrange the following in the accurate order of their association in electrical impulse movement – Synaptic knob, Axon terminal, Axon, dendrites, Cell body.

Q.12. Name the retina cells that allows us to see coloured objects.

Q.13. Rearrange the following in the sequential order of reception and transmission of sound waves from the eardrum –

External auditory nerve, eardrum, cochlear nerve, malleus, stapes, incus, cochlea

Q.14. List the structures that protect the brain.

Q.15. What do the white and grey matter in the human brain indicate?

3Mark Questions

Q.16. Write the similarities between computers and neural system. (Hint: CPU, input-output devices)

Q.17. How could it affect a person's CNS if he is attacked by a blow on the back of the neck?

Q.18. What is the role attributed to the Eustachian tube?

4Mark Questions

Q.19. CASE STUDY #1

The human neural system is divided into two parts –

- The central neural system (CNS)
- The peripheral neural system (PNS)

The CNS includes the brain and the spinal cord and is the site of information processing and control. The PNS comprises of all the nerves of the body associated with the CNS (brain and spinal cord). The nerve fibres of the PNS are of two types: Afferent fibres and Efferent fibres. The afferent nerve fibres transmit impulses from tissues/organs to the CNS and the efferent fibres transmit regulatory impulses from the CNS to the concerned peripheral tissues/organs.

The PNS is divided into two divisions called somatic neural system and autonomic neural system. The somatic neural system relays impulses from the CNS to skeletal muscles while the autonomic neural system transmits impulses from the CNS to the involuntary organs and smooth muscles of the body. The autonomic neural system is further classified into sympathetic neural system and parasympathetic neural system.

Visceral nervous system is the part of the peripheral nervous system that comprises the whole complex of nerves, fibres, ganglia, and plexuses by which impulses travel from the central nervous system to the viscera and from the viscera to the central nervous system.

1.) The afferent nerve fibres transmit impulses from _____

- a) Tissues to the CNS
- b) Organs to the CNS
- c) CNS to tissues
- d) Both a and b

2.) The efferent nerve fibres transmit impulses from _____

- a) Tissues to the CNS
- b) Organs to the CNS
- c) CNS to tissues
- d) Organ to organ

3.) How many types of nerve fibres do PNS have? Name them.

4.) Give the divisions of peripheral nervous system and their function?

5Mark Questions

Q.20. List the human forebrain parts representing their respective functions

Q.21. Describe the phenomena of release and transport of a neurotransmitter.

ANSWER KEY

1. 3

2. 3

3. 4

4. 4

5. 2

6. a

7. a

8. c

9. a

10. c

11. Dendrites, Cell body, Axon, Axon terminal, Synaptic knob.

12. Cone cells. There are three kinds of cones that have characteristic photopigments which react to red, blue, and green light.

13. Sound waves are received and transmitted in this order: External auditory nerve → eardrum → malleus → Incus → Stapes → Cochlea → Cochlear nerve.

14. Cranium – 8 cranial bones form the hard outer covering for the brain
Meninges – The brain is covered with three membranes called meninges. The pia mater, arachnoid membrane, and the dura mater
Cerebrospinal fluid – It is present in the spaces between the meninges and absorbs shocks.

15. The cerebral cortex is known as the grey matter as it appears grey in colour which is attributed to the neuron cell bodies imparting the colour. Fibres of the tracts are covered with the myelin sheath that forms the inner part of the cerebral hemisphere, imparting an opaque white appearance to the layer hence the white colour.

16. Various organs possess sensory neurons which sense the surroundings and send across the communication to the brain which is similar to the input device in computers. The human brain can be compared to the Central Processing Unit (CPU). The data that is gathered by the sensory neurons is processed by the brain which further commands the specific organ to work in accordance. Finally, the message is picked by the motor neurons that are similar to output devices.

17. It would lead to an impairment of cognitive abilities or dysfunctionalities physically. Furthermore, it can also cause disturbance of emotional or behavioural functioning. Cervical damages can lead to tetraplegia.

18. It connects the pharynx with the middle ear cavity and aids in equalizing pressures on both the parts of the eardrum. There is a valve present towards the pharyngeal opening of the tube that remains closed usually. It opens during swallowing, yawning, an unexpected change in altitude when the air leaves or enters the tympanic cavity so as to stabilize the air pressure on both parts of the tympanic membrane.

19. 1.) d

2) c

3) The nerve fibres of the PNS are of two types:

- Afferent fibres
- Efferent fibres

4) The PNS is divided into two major divisions called somatic neural system and autonomic neural system. The somatic neural system relays impulses from CNS to the skeletal muscles while ANS transmits impulses from CNS to the smooth muscles.

20. The human forebrain comprises of the cerebrum, hypothalamus, and the thalamus. The main component of the human brain is formed by the cerebrum which is separated longitudinally by a cleft into 2 halves, named as the left and the right cerebral hemisphere which are linked by a tract of nerve fibres known as the corpus callosum. Cerebral hemisphere is covered by a cell layer known as the cerebral cortex having evident folds. Its greyish appearance attributed by the cell bodies of the neuron is the reason the cerebral cortex is termed as the grey matter. It contains sensory areas, motor areas, and large regions which are neither motor nor sensory in function, and are referred to as association areas responsible for functionalities such as intersensory associations, communication, and memory. The inner part of the cerebral hemisphere is constituted by the fibres of the tracts comprised of the myelin sheath. It is called as the white matter as they impart an opaque white appearance to the layer. The thalamus is contained in the cerebrum which coordinates the motor and sensory signalling. At the base of the thalamus is the hypothalamus, containing several centres regulating the impulse for eating, drinking and body temperature. It also has a number of neurosecretory cells that produce hormones known as hypothalamic hormones. The limbic system is formed by the internal parts of the cerebral hemispheres and a combination of related deep structures such as the hippocampus, amygdala, etc. This system accompanying the hypothalamus

is concerned with controlling sexual behaviour, expressing emotional reactions, motivation, etc.

21. A.21. Synapses are junctions that transmit nerve impulses from one to another neuron. It is produced through the membranes of the postsynaptic and presynaptic neuron that may be or may not be parted by a synaptic cleft which is a gap. The membranes of the presynaptic and postsynaptic neurons at a chemical synapse are divided by a space filled with fluid known as the synaptic cleft. The neurotransmitters transmit impulses at such synapses. The axon terminals possess vesicles that have the neurotransmitters. When an impulse arrives, it reaches the axon terminal and triggers the action of the synaptic vesicles supporting the membrane wherein they join with the plasma membrane to produce their neurotransmitters, all in the synaptic cleft, which in turn attach to their particular receptors situated on the postsynaptic membrane. This union unfolds ion channels permitting the entrance of ions which can produce a new potential in the postsynaptic neuron which can either be inhibitory or excitatory.

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