Unit 21 · Nervous System

WORKSHEET

Full marks 32

Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 32

1 Key words [4]

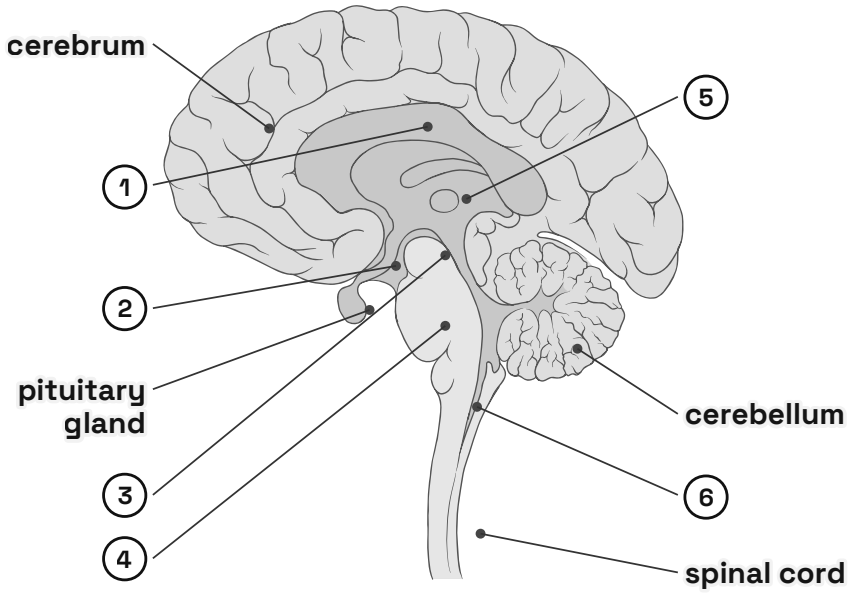
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

acetylcholinesterase	**choroid plexuses**	**dura mater**	**GABA**	**glutamate**	**nodes of Ranvier**
pia mater	**saltatory**	**subarachnoid space**	**thoracolumbar**		

The innermost meninx, thin and rich in blood vessels, which follows every fold of the brain, is the _____. Cerebrospinal fluid is made by the _____ in the ventricles. The space between the arachnoid and the pia mater, filled with cerebrospinal fluid, is the _____. The gaps in the myelin sheath of an axon are the _____. In myelinated fibers the impulse leaps from node to node: _____ conduction. The enzyme in the synaptic cleft that splits acetylcholine is _____. The brain's main inhibitory transmitter is _____. The sympathetic nerves leave the spinal cord from T1 to L2: a _____ outflow.

2 Label the diagram [3]

The diagram shows the human brain cut down the middle, seen from the left side. Write the names of the parts 1 to 6. Each carries 0.5 mark.



1. _____ **2.** _____

3. _____ **4.** _____

5. _____ **6.** _____

3 Multiple choice [5]

Choose the correct option for each of the following questions.

i. Which cranial nerve is the longest and serves the heart, lungs and gut? [1]

a. trigeminal
b. glossopharyngeal
c. vagus
d. accessory

ii. Noradrenaline is released at the organ by [1]

a. all preganglionic fibers
b. parasympathetic postganglionic fibers
c. most sympathetic postganglionic fibers
d. motor neurons at skeletal muscles

iii. During the rising phase (depolarization) of an action potential, the membrane potential becomes positive because [1]

a. the sodium–potassium pump carries Na^+ in
b. voltage-gated sodium channels open and Na^+ diffuses in
c. potassium channels open and K^+ flows in
d. chloride ions leave the axon

iv. A person can understand everything you say but has great difficulty speaking. Which area is most likely damaged? [1]

a. Broca's area, in the frontal lobe
b. Wernicke's area, in the temporal lobe
c. the visual area, in the occipital lobe
d. the somatosensory area, in the parietal lobe

v. After a fall, a person can think and talk normally but walks clumsily, misses when reaching for a cup, and sways when standing. Which part of the brain is most likely injured? [1]

a. medulla oblongata
b. cerebellum
c. hypothalamus
d. occipital lobe

4 Short answers [9]

Write short answers to the following questions.

a. State the all-or-none law. How, then, does the brain tell a light touch from a hard press? [2]

b. Why does an impulse travel only one way along an axon, and only one way across a chemical synapse? [2]

c. A farmer is poisoned by an organophosphate pesticide, which blocks acetylcholinesterase. Explain why his muscles twitch and may then be paralyzed. **[2]**

d. How is the resting membrane potential of a neuron kept up? **[3]**

5 Long answers **[8]**

Write long answers to the following questions.

a. Describe how a nerve impulse is produced at one patch of the membrane: depolarization, repolarization and hyperpolarization. **[4]**

b. Compare the sympathetic and parasympathetic nervous systems in their structure and their effects on the body. **[4]**

6 Think [3]

In multiple sclerosis the myelin of the brain and spinal cord is stripped away. Why do the patient's signals become slow or fail, even though the axons themselves are still there?

7 Activity: Catch the ruler (not marked)

Your partner holds a 30 cm ruler hanging down, its zero end between your open finger and thumb. Without warning they drop it; you catch it as fast as you can. Note the centimeter mark where you caught it. Try five times, then five times with your eyes shut while your partner says "now" as they drop it.

Try	Watching: caught at (cm)	Hearing "now": caught at (cm)
1		
2		
3		
4		
5		

Why does the ruler always fall some distance before you catch it?