



Attempt questions first; check the separate key afterward. Use labelled diagrams where asked. Give scientific reasons; answer key covers closed questions.

A. Very short answers - 1 mark each

1. Name the functional signalling cell of the nervous system.
2. Name the gap between two chemically communicating neurons.
3. Which cells form myelin around peripheral axons?
4. Name the gaps in a myelin sheath.
5. Is the resting neuron's interior electrically negative relative to outside?
6. Which ion mainly enters during action-potential depolarisation?
7. Which ion mainly leaves during repolarisation?
8. Name the two divisions of the central nervous system.

B. Short answers / practice - 2 marks each

9. Draw and label a neuron.
10. Compare sensory, motor and interneurons.
11. Distinguish myelinated and unmyelinated axons.
12. Explain the ionic basis of resting membrane potential.
13. Describe sodium-potassium pump action.
14. Explain threshold and the all-or-none principle.
15. Trace changes during an action potential.
16. Why does impulse transmission require selective membrane permeability?
17. Explain propagation along an unmyelinated axon.
18. Explain saltatory conduction and its advantage.
19. Compare electrical and chemical synapses.
20. Describe neurotransmitter release and receptor binding.

C. Application / reasoning - 3 marks each

21. Why is chemical synaptic transmission usually unidirectional?
22. Differentiate central and peripheral nervous systems.
23. Compare somatic and autonomic divisions.
24. Distinguish sympathetic and parasympathetic effects with examples.
25. Describe protective structures around the brain.
26. State major functions of cerebrum, thalamus and hypothalamus.
27. Explain the roles of midbrain, pons, medulla and cerebellum.
28. Name the brain structure linking the two cerebral hemispheres.
29. Name the brain region chiefly involved in balance and posture.
30. Explain why local anaesthesia can prevent sensory signalling without damaging the brain.
31. Does a stronger suprathreshold stimulus make an individual action potential arbitrarily larger?

D. Extended practice - 5 marks each

32. Explain resting and action potentials with a labelled voltage-time graph.
33. Describe transmission across a chemical synapse and its directionality.
34. Draw major parts of the human brain and explain their functions.
35. Compare neural pathways controlling voluntary and involuntary actions, including autonomic antagonism.

ANSWER KEY - Numerical / closed questions

1) Neuron. 2) Synaptic cleft. 3) Schwann cells. 4) Nodes of Ranvier. 5) Yes. 6) Na^+ . 7) K^+ . 8) Brain and spinal cord. 13) Three Na^+ pumped out and two K^+ in per ATP. 28) Corpus callosum. 29) Cerebellum. 31) No; strength is largely encoded by firing frequency/recruitment.