Q1. In a neuron, the nerve impulse is always conducted:

A. From axon to dendrite
B. From dendrite to axon
C. From axon terminal to cell body
D. Randomly in either direction

Answer: B. From dendrite to axon
Explanation: A typical neuron conducts impulses unidirectionally, from dendrites → cell body → axon. This polarity ensures effective communication.

Q2. Which of the following ions plays the most critical role in the depolarisation phase of an action potential?

A. Na^+
B. K^+
C. Ca^{2+}
D. Cl^-

Answer: A. Na^+
Explanation: During depolarisation, sodium channels open, and Na^+ ions rush inside the neuron, making the membrane potential more positive.

Q3. Myelin sheath is formed by:

A. Schwann cells in CNS and oligodendrocytes in PNS
B. Oligodendrocytes in CNS and Schwann cells in PNS
C. Astrocytes in CNS and Schwann cells in PNS
D. Microglia in PNS

Answer: B. Oligodendrocytes in CNS and Schwann cells in PNS
Explanation: Myelin sheath is formed by oligodendrocytes in the central nervous system and Schwann cells in the peripheral nervous system.

Q4. The area of the human brain responsible for higher functions like memory and intelligence is:

A. Cerebellum
B. Medulla
C. Cerebrum

D. Hypothalamus

Answer: C. Cerebrum
Explanation: Cerebrum is the largest part of the brain, responsible for memory, reasoning, intelligence, and voluntary actions.

Q5. Which of the following reflex actions is monosynaptic in nature?

A. Knee-jerk reflex
B. Withdrawal of hand from heat
C. Blinking of eyes
D. Pupil contraction

Answer: A. Knee-jerk reflex
Explanation: Knee-jerk reflex involves just one synapse between sensory and motor neuron — a classic monosynaptic reflex.

Q6. Nodes of Ranvier:

A. Are gaps in axon with high electrical resistance
B. Are sites of continuous conduction
C. Allow saltatory conduction of nerve impulses
D. Are absent in unmyelinated axons

Answer: C. Allow saltatory conduction of nerve impulses
Explanation: Nodes of Ranvier are gaps between myelin sheaths that enable saltatory conduction, where impulses jump from node to node, speeding up transmission.

Q7. Match the following brain parts with their functions:

| A. Cerebellum | 1. Hunger and thirst regulation
| B. Hypothalamus | 2. Coordination of movement
| C. Medulla | 3. Involuntary functions

Choose the correct match:
A. A-2, B-1, C-3
B. A-1, B-2, C-3
C. A-3, B-2, C-1

D. A-2, B-3, C-1

Answer: A. A-2, B-1, C-3
Explanation:

Cerebellum: Coordinates posture and movements

Hypothalamus: Controls thirst, hunger, and body temperature

Medulla: Controls involuntary functions like heart rate and respiration

Q8. Which part of the brain is involved in maintaining posture and balance?

A. Medulla oblongata
B. Hypothalamus
C. Cerebrum
D. Cerebellum

Answer: D. Cerebellum
Explanation: The cerebellum fine-tunes voluntary movements and helps maintain posture and balance.

Q9. A person is unable to control body temperature and appetite. Which part of the brain is likely affected?

A. Thalamus
B. Cerebellum
C. Hypothalamus
D. Corpus callosum

Answer: C. Hypothalamus
Explanation: The hypothalamus is the center for thermoregulation and controls hunger, thirst, circadian rhythm, and pituitary hormone release.

Q10. Which statement is correct regarding synaptic transmission?

A. Neurotransmitters are always inhibitory
B. Synapse can conduct impulse bidirectionally
C. Calcium ions are necessary for neurotransmitter release
D. Postsynaptic membrane generates action potential automatically

Answer: C. Calcium ions are necessary for neurotransmitter release
Explanation: When the impulse reaches the presynaptic terminal, Ca^{2+} channels open, causing neurotransmitter release into the synaptic cleft.

Q11. Assertion and Reason

Assertion (A): Myelinated neurons conduct impulses faster than non-myelinated ones.
Reason (R): Myelin sheath allows saltatory conduction of impulses.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Myelin acts as an insulator, enabling impulses to jump between nodes of Ranvier, thus increasing the speed of conduction.

Q12. Choose the correct statement:

A. Axon conducts impulses toward the cell body.
B. Dendrites always transmit impulses to effector organs.
C. Synapse is the junction between two neurons.
D. Cell body is incapable of generating impulses.

Answer: C
Explanation: A synapse is a junction between two neurons where impulse transmission occurs chemically (most commonly) via neurotransmitters.

Q13. Which of the following are inhibitory neurotransmitters?

1. GABA

2. Dopamine

3. Glutamate

4. Serotonin

A. 1 and 4
B. 1 and 2
C. 2 and 3
D. 3 and 4

Answer: B
Explanation: GABA (Gamma-Aminobutyric Acid) and Dopamine can act as inhibitory neurotransmitters, whereas glutamate is excitatory.

Q14. Match the columns:

Column I (Structure)	Column II (Function)
A. Corpus callosum	1. Controls pituitary gland
B. Hypothalamus	2. Connects cerebral hemispheres
C. Medulla oblongata	3. Controls heartbeat and respiration
D. Thalamus	4. Relay center for sensory impulses

A. A-2, B-1, C-3, D-4
B. A-1, B-2, C-3, D-4
C. A-2, B-4, C-3, D-1
D. A-2, B-1, C-4, D-3

Answer: A
Explanation:

Corpus callosum connects left and right cerebral hemispheres

Hypothalamus regulates endocrine functions via the pituitary

Medulla regulates vital functions

Thalamus relays sensory data to cerebrum

Q15. Choose the incorrect statement:

A. Neurotransmitters are stored in synaptic vesicles
B. Nerve impulse transmission across electrical synapse is always unidirectional
C. Synaptic cleft is the space between two neurons
D. Neurotransmitter release depends on calcium influx

Answer: B
Explanation: In electrical synapses, impulse transmission is usually bidirectional and faster, unlike chemical synapses.

Q16. Which part of the brain regulates circadian rhythms?

A. Pons
B. Medulla
C. Hypothalamus
D. Thalamus

Answer: C
Explanation: The suprachiasmatic nucleus of the hypothalamus controls biological clock functions like sleep-wake cycle (circadian rhythms).

Q17. A blow to the back of the head may affect:

A. Memory
B. Speech
C. Coordination and balance
D. Hunger and thirst

Answer: C
Explanation: The cerebellum, located at the posterior part of the brain, controls balance and posture. A blow here may disrupt coordination.

Q18. The conduction of impulse along a non-myelinated axon is:

A. Faster than in myelinated axon
B. Saltatory in nature
C. Continuous and slower
D. Not possible

Answer: C
Explanation: In non-myelinated axons, impulse conduction is continuous, not saltatory, and thus slower.

Q19. Which of the following is correctly matched?

A. Midbrain – Thermoregulation
B. Pons – Swallowing reflex
C. Medulla – Respiration
D. Cerebrum – Involuntary movements

Answer: C
Explanation: The medulla oblongata regulates breathing, heart rate, and blood pressure.

Q20. Assertion and Reason

Assertion (A): At the synaptic terminal, calcium ions trigger neurotransmitter release.
Reason (R): Calcium ions enter the presynaptic terminal through ligand-gated channels.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: C
Explanation: A is true — Ca^{2+} triggers neurotransmitter release.
But R is false — Ca^{2+} enters via voltage-gated channels, not ligand-gated ones.

Q21. Match the column

Column I (Neural Disorder) Column II (Cause/Effect)

A. Parkinson's disease 1. Loss of myelin sheath
B. Epilepsy 2. Abnormal electrical discharge in brain
C. Alzheimer's disease 3. Loss of memory and mental function
D. Multiple sclerosis 4. Dopamine deficiency

Options:
A. A-4, B-2, C-3, D-1
B. A-1, B-2, C-4, D-3
C. A-2, B-1, C-4, D-3
D. A-3, B-4, C-2, D-1

Answer: A
Explanation:

Parkinson's – ↓ Dopamine

Epilepsy – Abnormal brain electrical activity

Alzheimer's – Memory loss

Multiple sclerosis – Demyelination of neurons

Q22. Assertion and Reason

Assertion (A): Reflex actions are faster than voluntary actions.
Reason (R): Reflex actions bypass the brain and are processed in the spinal cord.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Reflex arcs pass through spinal cord, reducing the reaction time.

Q23. Which part of the human brain is responsible for fine motor control and balance?

A. Pons
B. Cerebellum
C. Cerebrum
D. Medulla

Answer: B
Explanation: Cerebellum controls posture, coordination, and precision movements.

Q24. Which of the following is not part of the hindbrain?

A. Pons
B. Cerebellum
C. Medulla
D. Midbrain

Answer: D
Explanation: Midbrain is part of the brainstem, not hindbrain.

Q25. Which among the following are correct about axon?

1. It transmits impulses away from the cell body

2. It is covered by Schwann cells in myelinated neurons

3. It contains Nissl granules

4. Axon terminal releases neurotransmitters

A. 1, 2, and 4
B. 1 and 3
C. 2 and 3
D. 1, 2, 3, and 4

Answer: A
Explanation: Nissl granules are found in cell body and dendrites, not in axon.

Q26. Assertion and Reason

Assertion (A): Nodes of Ranvier help in increasing the speed of nerve impulse conduction.
Reason (R): These are gaps in the myelin sheath where action potentials are generated.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Saltatory conduction occurs at nodes, enabling faster impulse travel.

Q27. Which cranial nerve is both sensory and motor in function?

A. Olfactory (I)
B. Optic (II)
C. Vagus (X)
D. Hypoglossal (XII)

Answer: C
Explanation: Vagus nerve (X) is mixed — involved in autonomic control of heart, lungs, and GI tract.

Q28. Which is true about the synapse?

A. Synaptic cleft is absent in chemical synapse
B. Neurotransmitter acts on postsynaptic receptors
C. Impulse conduction is electrical only
D. Postsynaptic membrane releases neurotransmitter

Answer: B
Explanation: Neurotransmitters bind to receptors on the postsynaptic membrane to transmit signal.

Q29. The grey matter of the brain:

A. Consists of myelinated axons
B. Lies deep inside the cerebrum
C. Consists of neuron cell bodies and dendrites
D. Forms the cerebellar white matter

Answer: C
Explanation: Grey matter = cell bodies, dendrites, unmyelinated axons. It is the outer layer in the brain (cortex).

Q30. Match the following neural structures with their location

Column I (Structure) Column II (Location)

A. Medulla 1. Below pons
B. Hypothalamus 2. Below thalamus
C. Cerebellum 3. Posterior to brainstem
D. Corpus callosum 4. Between left and right cerebrum

A. A-1, B-2, C-3, D-4
B. A-2, B-1, C-4, D-3
C. A-4, B-3, C-2, D-1
D. A-1, B-4, C-2, D-3

Answer: A
Explanation:

Medulla is below pons

Hypothalamus lies below thalamus

Cerebellum is behind brainstem

Corpus callosum connects two cerebral hemispheres

Q31. Which of the following statements about the cerebrum is/are correct?

1. It is the largest part of the human brain

2. It is responsible for intelligence and memory

3. It has gyri and sulci to increase surface area

4. It regulates involuntary activities

Options:

A. 1, 2, and 3 only
B. 2 and 4 only
C. 1 and 4 only
D. All of the above

Answer: A
Explanation: Cerebrum controls voluntary functions, not involuntary ones.

Q32. Assertion and Reason

Assertion (A): Myelin sheath increases the speed of nerve impulse conduction.
Reason (R): Myelin acts as an insulator and allows saltatory conduction.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Myelin prevents ion leakage and enables impulses to jump via Nodes of Ranvier.

Q33. Which part of the brain controls hunger and thirst?

A. Thalamus
B. Hypothalamus
C. Medulla oblongata
D. Pons

Answer: B
Explanation: Hypothalamus regulates homeostatic functions — hunger, thirst, body temperature.

Q34. Which of the following are characteristic of sympathetic nervous system?

1. Increases heart rate

2. Dilates pupil

3. Slows down digestion

4. Promotes glycogen synthesis

Options:
A. 1, 2, and 3 only
B. 1 and 4 only
C. 1, 2, 3, and 4
D. 2 and 4 only

Answer: A
Explanation: Sympathetic system is fight or flight — inhibits digestion, promotes glycogen breakdown, not synthesis.

Q35. Match the column: Types of neurons and function

Column I (Neuron Type)	Column II (Function)
A. Sensory neuron	1. Connects sensory and motor neurons
B. Motor neuron	2. Carries response from CNS to effectors
C. Interneuron	3. Carries stimulus to CNS

Options:
A. A-3, B-2, C-1
B. A-2, B-1, C-3
C. A-1, B-3, C-2
D. A-3, B-1, C-2

Answer: A
Explanation: Sensory = afferent, Motor = efferent, Interneuron = relay

Q36. Which structure connects the two hemispheres of the cerebrum?

A. Corpus callosum
B. Cerebellum
C. Pons
D. Thalamus

Answer: A
Explanation: Corpus callosum is a bundle of nerve fibers connecting left and right hemispheres.

Q37. Which one of the following is not correctly matched?

A. Medulla – Swallowing, vomiting, heartbeat
B. Cerebellum – Precision of movement
C. Hypothalamus – Language interpretation
D. Thalamus – Relay center of sensory signals

Answer: C
Explanation: Language interpretation is done by Wernicke's area, in the cerebrum.

Q38. Assertion and Reason

Assertion (A): Action potential is generated when threshold is reached.
Reason (R): At threshold, Na^+ channels open, leading to depolarization.

A. Both A and R are true, and R is the correct explanation
B. Both A and R are true, but R is not the correct explanation
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Once threshold is crossed, voltage-gated Na^+ channels open → depolarization.

Q39. The resting membrane potential of a neuron is:

A. +70 mV
B. –70 mV
C. –90 mV
D. 0 mV

Answer: B
Explanation: Resting neuron has more Na^+ outside and more K^+ inside, leading to –70 mV.

M

Q40. Identify the correct statements:

1. Cerebrospinal fluid protects brain and spinal cord

2. Medulla controls cardiac, respiratory centers

3. Schwann cells form myelin in CNS

4. Dendrites receive stimuli and conduct impulses toward cell body

Options:
A. 1, 2, and 4
B. 2, 3, and 4
C. 1 and 3 only
D. All of the above

Answer: A
Explanation: Schwann cells form myelin in PNS, not CNS.

Q41. Which neurotransmitter is inhibitory in nature?

A. Dopamine
B. Acetylcholine
C. GABA
D. Glutamate

Answer: C
Explanation: GABA (Gamma Amino Butyric Acid) is the main inhibitory neurotransmitter in CNS.

Q42. Which part of the brain acts as a relay station for sensory information (except smell)?

A. Hypothalamus
B. Cerebellum
C. Thalamus
D. Medulla

Answer: C
Explanation: Thalamus processes and relays all sensory input except olfaction.

Q43. Assertion and Reason

Assertion (A): The impulse transmission across a chemical synapse is unidirectional.
Reason (R): Neurotransmitters are released only from presynaptic neurons.

A. Both A and R are true, and R is the correct explanation
B. Both A and R are true, but R is not the correct explanation
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Vesicles with neurotransmitters are present only in presynaptic knobs.

Q44. Which of these neurons are multipolar?

A. Sensory neurons
B. Interneurons of CNS
C. Motor neurons
D. Both B and C

Answer: D
Explanation: Multipolar neurons are found in CNS and motor pathways.

Q45. During resting potential, which of the following occurs?

A. Na^+ concentration is higher inside the neuron
B. K^+ concentration is higher outside the neuron
C. Neuron interior is negative relative to outside
D. Sodium-potassium pump brings K^+ into the neuron and Na^+ out

Answer: C
Explanation: Resting membrane potential is maintained by Na^+/K^+ pump, keeping the inside negative.