

NBCE
Mock Board Questions
Spinal Anatomy - A

1. The following statements concerning the cytology of a neuron are correct **EXCEPT:**
 - A. A unipolar neuron is one that gives rise to a single neurite that remains unbranched until it reaches its destination and synapses with a second neuron.
 - B. A bipolar neuron is one that gives rise to a neurite that emerges from each end of the cell body. The sensory ganglia of the vestibulocochlear nerve (eighth cranial nerve) possess bipolar neurons.
 - C. Nissl substance is not found in the axon of a neuron.
 - D. The Golgi complex is important in the synthesis of cell membranes.

2. The following statements concerning peripheral nerve plexuses are true **EXCEPT:**
 - A. They are formed by a network of nerve fibers.
 - B. Bundles of nerve fibers branch, but in most instances the individual nerve fibers do not branch.
 - C. The plexuses at the roots of the limbs are formed from posterior rami of spinal nerves.
 - D. The plexuses of the autonomic nervous system possess a network of nerve fibers and nerve cells.

3. The following statements concerning the vertebral levels and the spinal cord segmental levels are correct **EXCEPT:**
 - A. The first lumbar vertebra lies opposite the sacral and coccygeal segments of the cord.
 - B. The third thoracic vertebra lies opposite the fifth thoracic spinal cord segment.
 - C. The fifth cervical vertebra lies opposite the seventh cervical spinal cord segment.
 - D. The eighth thoracic vertebra lies opposite the eleventh thoracic spinal cord segment.

4. The following statements concerning the cerebrum are correct **EXCEPT:**
 - A. The cerebral hemispheres are separated by a deep cleft called the longitudinal fissure.
 - B. The lobes are named for the skull bones under which they lie.
 - C. The corpus callosum is a mass of gray matter lying within each cerebral hemisphere.
 - D. The internal capsule is an important collection of nerve fibers having the caudate nucleus and the thalamus on its medial side and the lentiform, nucleus on its lateral side.

5. The following important structures are located in the brainstem at the level stated **EXCEPT:**
- A. The red nucleus lies within the midbrain.
 - B. The facial colliculus lies in the caudal part of the pons.
 - C. The motor nucleus of the trigeminal nerve lies within the cranial part of the pons.
 - D. The abducent nucleus lies within the cranial part of the pons.
6. The following statements concerning the corticospinal tracts are correct **EXCEPT:**
- A. Those that control the movements of the upper limb originate in the precentral gyrus on the medial side of the cerebral hemisphere.
 - B. They are mainly responsible for controlling the voluntary movements in the distal muscles of the limbs.
 - C. They arise as axons of the pyramidal cells in the fifth layer of the cerebral cortex.
 - D. They occupy the posterior limb of the internal capsule.
7. The following statements concerning muscle reflexes are correct **EXCEPT:**
- A. The biceps brachii tendon reflex involves C5 and C6 segments of the spinal cord.
 - B. The triceps tendon reflex involves the T1 segment of the spinal cord.
 - C. The patellar tendon reflex (knee jerk) involves L2,3, and 4 segments of the spinal cord.
 - D. A tumor pressing on the first and second sacral segments of the spinal cord is likely to interfere with the ankle jerk.
8. The following statements concerning the dermatomes of the trunk and lower limbs are true **EXCEPT:**
- A. The T10 dermatome includes the skin of the umbilicus.
 - B. The L1 dermatome lies over the inguinal ligament.
 - C. The L2 dermatome lies over the medial side of the knee joint.
 - D. The S1 dermatome runs along the lateral side of the foot
9. The following statements concerning the functions of the cerebellum are correct **EXCEPT:**
- A. The cerebellum influences the actions of skeletal muscle.
 - B. The cerebellum controls voluntary movement by coordinating the force and extent of contraction of different muscles.
 - C. The cerebellum inhibits the contraction of antagonistic muscles.
 - D. The cerebellum directly influences skeletal muscle activity without the assistance of the cerebral cortex.

10. The following statements concerning the cerebellum are correct **EXCEPT:**
- A. The afferent climbing fibers make multiple synaptic contacts with 1-10 Purkinje cells.
 - B. The afferent mossy fibers may stimulate many Purkinje cells by first stimulating the granular cells.
 - C. The neurons of the intracerebellar nuclei send axons without interruption to the opposite cerebral hemisphere.
 - D. The output of the cerebellar nuclei influences muscle activity so that movements can progress in an orderly sequence from one movement to the next.
11. The following statements concerning the colliculi of the midbrain are correct **EXCEPT:**
- A. They are located in the tegmentum.
 - B. The superior colliculi are concerned with sight reflexes.
 - C. The inferior colliculi lie at the level of the trochlear nerve nuclei.
 - D. The inferior colliculi are concerned with auditory reflexes.
12. The following statements concerning the third cranial nerve nuclei are correct **EXCEPT:**
- A. The oculomotor nucleus is situated in the central gray matter.
 - B. The parasympathetic part of the oculomotor nucleus is called the Edinger-Westphal nucleus.
 - C. The oculomotor nucleus lies posterior to the cerebral aqueduct.
 - D. The nerve fibers from the oculomotor nucleus pass through the red nucleus.
13. The following statements concerning the spinal cord are correct **EXCEPT:**
- A. The anterior and posterior gray columns on the two sides are united by a gray commissure.
 - B. The terminal ventricle is the expanded lower end of the central canal.
 - C. The larger nerve cell bodies in the anterior gray horns give rise to the alpha efferent nerve fibers in the anterior roots.
 - D. The substantia gelatinosa groups of cells are located at the base of each posterior gray column.
14. The following statements concerning the white columns of the spinal cord are correct **EXCEPT:**
- A. The posterior spinocerebellar tract is situated in the lateral white column.
 - B. The anterior spinothalamic tract is found in the anterior white column.
 - C. The lateral spinothalamic tract is found in the lateral white column.
 - D. The fasciculus gracilis is found in the lateral white column.

15. The following statements concerning the spinal cord are correct **EXCEPT**:
- A. The spinal cord has a cervical enlargement for the brachial plexus.
 - B. It possesses 34 pairs of spinal nerves.
 - C. In the adult, the spinal cord usually ends inferiorly at the lower border of the first lumbar vertebra.
 - D. The ligamentum denticulatum anchors the spinal cord to the dura mater along each side.
16. The following statements concerning the basal ganglia are correct **EXCEPT**:
- A. The caudate nucleus is fused with the lentiform nucleus.
 - B. The corpus striatum is concerned with muscular movement.
 - C. The lentiform nucleus is related medially to the external capsule.
 - D. The lentiform nucleus is wedge-shaped as seen on horizontal section.
17. The following statements concerning the thalamus are correct **EXCEPT**:
- A. It is the largest part of the diencephalon and serves as a relay station to all the main sensory tracts (except the olfactory pathways).
 - B. It is separated from the lentiform nucleus by the internal capsule.
 - C. It forms the anterior boundary of the interventricular foramen.
 - D. It may be joined to the thalamus on the opposite side.
18. The following statements concerning the hypothalamus are correct **EXCEPT**:
- A. It is formed by the lower part of the lateral wall and floor of the third ventricle.
 - B. Functionally, it plays a role in the release of pituitary hormones.
 - C. Caudally the hypothalamus merges with the tectum of the midbrain.
 - D. The nuclei composed of groups of small nerve cells.
19. The following statements concerning the anterior surface of the medulla oblongata are correct **EXCEPT**:
- A. The pyramids taper inferiorly and give rise to the decussation of the pyramids.
 - B. On each side of the midline there is an ovoid swelling called the olive, which contains the corticospinal fibers.
 - C. The hypoglossal nerve emerges between the pyramid and the olive.
 - D. The vagus nerve emerges between the olive and the inferior cerebellar peduncle.
20. Which statement is **NOT** true about the mesencephalic nucleus of V:
- A. It contains the cell bodies of second-order sensory neurons
 - B. It is involved in the jaw-jerk reflex
 - C. Axons of its neurons travel in the trigeminal nerve
 - D. Axons of its neurons synapse in the trigeminal motor nucleus
21. Loss of pain, temperature, and touch sensation on the right side of the face could be caused by a lesion of the:
- A. Left spinal trigeminal nucleus
 - B. Right spinal trigeminal nucleus
 - C. Right chief sensory nucleus V
 - D. Ventral trigeminothalamic tract on the left

22. Touching the cornea of the right eye of a patient does not cause a response, but touching the left cornea causes both eyes to blink. This would be caused by a lesion of:
- A. The left ophthalmic branch of trigeminal nerve
 - B. The right ophthalmic branch of trigeminal nerve
 - C. The right oculomotor nerve
 - D. The right optic nerve
23. Which of the following statements about the eye is **FALSE**:
- A. Aqueous humor is produced by the secretory retina
 - B. Relaxation of the ciliary muscle causes the lens to flatten (become less convex)
 - C. Convergence in the pathway increases the retina's sensitivity to light
 - D. The optic disc contains only cones and has the highest visual acuity
24. Schwann cells and oligodendrocytes are similar in that **BOTH**:
- A. Are phagocytic
 - B. Form myelin around axons
 - C. Secrete large amounts of collagen
 - D. Produce the blood-brain barrier
25. Which of the following statements about the meninges is **FALSE**:
- A. Inner and outer layers of dura separate to form a space filled primarily with CSF
 - B. Falx cerebri and tentorium cerebelli are reflections of dura mater
 - C. Arachnoid and pia mater initially develop from a single membrane
 - D. Subarachnoid cisterns are reservoirs of CSF
26. Which is the correct listing of the temporal order of events leading to presynaptic release of a chemical neurotransmitter?
- A. Vesicle fusion, transmitter release, presynaptic depolarization, calcium influx
 - B. Calcium channel opening, calcium influx, depolarization, vesicle fusion
 - C. Calcium influx, internal calcium release, depolarization, vesicle fusion
 - D. Action potential, opening of calcium channels, calcium influx, vesicle fusion
27. Information about tactile sensation from the chin is carried by all of the following **EXCEPT**:
- A. Chief sensory nucleus of V
 - B. Mandibular division of cranial nerve V
 - C. Mesencephalic nucleus
 - D. Ventral trigeminothalamic tract
28. Information from the lower nasal retina of the right eye would be found all the following locations **EXCEPT** the:
- A. Right optic tract
 - B. Right optic nerve
 - C. Left loop of Meyer
 - D. Left temporal lobe

29. On examination, you find that a patient's eyes have the position at rest shown on the right. This *is* most likely due to a lesion of:
- A. Right cranial nerve VI nucleus
 - B. Left cranial nerve VI nucleus
 - C. Left cranial nerve III
 - D. Right cranial nerve III
30. The accommodation reflex would be affected by damage to which of the following structures:
- A. Left and right occipital cortex
 - B. Right cranial nerve III
 - C. Right Edinger Westfall nucleus
 - D. All of the above
31. Horner's syndrome would be caused by damage to which of the following structures:
- A. Edinger-Westfall nucleus
 - B. Trigeminothalamic fibers
 - C. Reticulospinal fibers
 - D. Cranial nerve III
32. A patient has a large left pupil that does not respond to light shone into either eye although the right pupil does respond. This could be caused by damage to the:
- A. Left optic nerve
 - B. Left cranial nerve III
 - C. Right cranial nerve III
 - D. Left pretectal nucleus
33. All of the following contain axons or cell bodies of second-order sensory neurons **EXCEPT**:
- A. Medial lemniscus
 - B. Fasciculus cuneatus
 - C. Internal arcuate fibers
 - D. Nucleus gracilis
34. The developmental compartment known as the metencephalon forms which of the following structures in the adult nervous system:
- A. Pons
 - B. Midbrain
 - C. Cerebral hemispheres
 - D. Thalamus
35. The three primary vesicles from which the nervous system first develops are:
- A. Prosencephalon, mesencephalon, metencephalon
 - B. Prosencephalon, mesencephalon, rhombencephalon
 - C. Telencephalon, prosencephalon, mesencephalon
 - D. Telencephalon, diencephalon, rhombencephalon

36. Cerebrospinal fluid enters the venous system at which structure:
- A. Foramen of Magendie
 - B. Interventricular foramen
 - C. Foramen of Luschka
 - D. Arachnoid villi
37. All of the following statements about dendrites are true **EXCEPT**:
- A. They have a myelin sheath
 - B. Generally they are short processes close to the cell body
 - C. Most synapses occur on spines of dendrites
 - D. They are the afferent (receiving) part of the neuron
38. A patient shows a loss of tactile sensation on the right starting at the level of the umbilicus and continuing over the rest of the lower right body. There is also a loss of pain and temperature on the left from the level of the lower abdomen (about 4-5 inches below the umbilicus) and below on the left. This would be caused by a lesion of the spinal cord:
- A. On the left at T8
 - B. On the left at T10
 - C. On the right at T8
 - D. On the right at T10
39. Which statement about cells in nucleus cuneatus is **FALSE**:
- A. Convergence of inputs allows them to respond better to larger stimuli
 - B. It receives sensory information from the upper body
 - C. Inhibitory interneurons allow some cells to respond better to small stimuli than to large stimuli
 - D. It is located in the spinal cord
40. Which type of glial cell participates in removing neurotransmitter from the synaptic cleft in the CNS:
- A. Microglia
 - B. Schwann cell
 - C. Astrocyte
 - D. Oligodendrocyte
41. The myelin sheath around axons:
- A. Can be formed by schwann cell
 - B. Is a continuous covering from cell body to terminals
 - C. Decreases the electrical capacitance of the axon
 - D. Only A and C are correct
42. Which of the following statements about neurons is **TRUE**:
- A. Dendrites are usually unmyelinated
 - B. When an axon reaches its target, it generally synapses without branching
 - C. Neuronal cell bodies contain little rough endoplasmic reticulum
 - D. Axonal transport is necessary only for neurons with small diameter axons

43. A patient displays a symmetrical loss of pain and temperature on the shoulder area on both sides of the body with no loss of tactile sensation. Pain and temperature and tactile sensation are normal over the rest of the body. This condition would be due mostly likely to lesion of:
- A. Anterior white commissure from C2 to C4
 - B. Anterior white commissure from C6 to T1
 - C. Anterior white commissure from T1 to T5
 - D. Anterolateral system on right at C2
44. Fibers that descend from brainstem to spinal cord to inhibit pain transmission arise in:
- A. Periaqueductal gray
 - B. Nucleus raphe magnus
 - C. Association cortex
 - D. Cingulate cortex
 - E. All of the above
45. The epidural space around the brain:
- A. Is a potential space located between the periosteum and the dura mater
 - B. Is a potential space that may fill with blood and cause hydrocephalus
 - C. Contains cerebrospinal fluid
 - D. A and C
46. All of the following statements about the axon shaft are true **EXCEPT**:
- A. Axonal diameter influences conduction velocity of the action potential
 - B. Ion channels are clustered at nodes of Ranvier.
 - C. It contains parallel arrays of neurofilaments and microtubules
 - D. The length constant is inversely proportional to the axon diameter
47. Which of the following statements about astrocytes is **TRUE**:
- A. They form myelin in the central nervous system
 - B. They produce large amounts of collagen in the central nervous system
 - C. They participate in forming the blood-brain barrier
 - D. They can be phagocytic in function
48. The most common excitatory transmitter in the central nervous system is:
- A. Acetylcholine
 - B. Glutamate
 - C. Glycine
 - D. Serotonin
49. The decussation (crossing) of the medial lemniscus (internal arcuate fibers) is located in the:
- A. Spinal cord
 - B. Medulla
 - C. Pons
 - D. Midbrain

50. Axons of which of the following tracts cross from one side of the nervous system to the other:
- A. Ascending root of V
 - B. Fasciculus cuneatus
 - C. Dorsolateral fasciculus
 - D. Ventral trigeminothalamic tract
51. A lesion of the ventral trigeminothalamic tract at the level of the midbrain on one side would result in:
- A. Loss of only pain and temperature sensation on the ipsilateral face
 - B. Loss of pain, temperature, and touch sensation on the ipsilateral face
 - C. Loss of pain, temperature, and touch sensation on the contralateral face
 - D. Paralysis of jaw muscles on the contralateral side
52. The ability of identify the value of unseen coins in your pocket as you handle them depends on an intact:
- A. Anterior spinothalamic tract
 - B. Lateral spinothalamic tract
 - C. Medial Lemniscus
 - D. Spinal tract of V

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QUESTIONS
SPINAL
ANATOMY-A
Answer Key**

- 1. A
- 2. C
- 3. C
- 4. C
- 5. D
- 6. A
- 7. B
- 8. C
- 9. D
- 10. C
- 11. A
- 12. C
- 13. D

- 14. D
- 15. B
- 16. C
- 17. C
- 18. C
- 19. B
- 20. A
- 21. D
- 22. B
- 23. D
- 24. B
- 25. A
- 26. D
- 27. C
- 28. A
- 29. D
- 30. D
- 31. C
- 32. B
- 33. A

- 34. A
- 35. B
- 36. D
- 37. A
- 38. D
- 39. D
- 40. C
- 41. D
- 42. A
- 43. A
- 44. B
- 45. A
- 46. D
- 47. C
- 48. B
- 49. B
- 50. D
- 51. C
- 52. C