

**NBCE
MOCK BOARD QUESTIONS
SPINAL ANATOMY**

1. What are the components of the neural arch of a vertebra?
 - A. transverse process, pedicles, vertebral body
 - B. pedicles, laminae
 - C. vertebral body, pedicles, laminae
 - D. intervertebral foramen, vertebral body, pedicles, laminae

2. Which vertebrae have a transverse foramen?
 - A. cervical vertebra
 - B. thoracic vertebra
 - C. lumbar vertebra
 - D. sacral vertebra

3. Which of the following is **NOT** a boundary of the vertebral foramen?
 - A. posterior portion of the vertebral body
 - B. pedicle of the vertebra
 - C. laminae of the vertebra
 - D. intervertebral disc

4. There are _____ intervertebral discs in the adult human.
 - A. 12
 - B. 18
 - C. 23
 - D. 26

5. The groove for the vertebral artery is located on the ____ aspect of the ____ of the atlas.
 - A. superior, posterior arch
 - B. superior, anterior arch
 - C. inferior, posterior arch
 - D. inferior, anterior arch

6. Which vertebra is called the epistropheus?
 - A. C1
 - B. C7
 - C. the fused sacral vertebrae
 - D. C2

7. How many articular surfaces are present on the first thoracic vertebra?
 - A. 6
 - B. 8
 - C. 10
 - D. 12

8. The superior articular facets of T4 face in a ____ direction.
- A. anterior
 - B. posterior
 - C. anterolateral
 - D. posterolateral
9. Which of the following ligaments attaches theinion to the spinous process of C7?
- A. ligamentum flavum
 - B. tectorial membrane
 - C. occipitocervical ligament
 - D. nuchal ligament
10. Which of the following muscles does **NOT** attach to the atlas?
- A. levator scapulae m.
 - B. rectus capitis posterior minor m.
 - C. rectus capitis posterior major m.
 - D. obliquus capitis superior m.
11. There are ____ spinal nerves.
- A. 23
 - B. 31
 - C. 56
 - D. 62
12. At what vertebral level is the spinal segment that gives rise to spinal nerve S1 found?
- A. T1
 - B. T10
 - C. L1
 - D. S1
13. Which branch of the spinal nerve carries GSE information to the muscles of the anterior and lateral trunk and all the muscles of the limbs?
- A. recurrent meningeal nerve
 - B. anterior ramus
 - C. posterior ramus
 - D. rami communicantes
14. If the skin is pricked with a pin one-inch lateral to the spinous process of C7, which branch of the spinal nerve carries this info to your spinal cord?
- A. anterior ramus
 - B. medial branch of posterior rami
 - C. lateral branch of posterior rami
 - D. recurrent meningeal nerve

15. The roots of the brachial plexus combine to directly form _____.
- A. divisions
 - B. terminal branches
 - C. trunks
 - D. cords
16. The internal voltage at which the neuron will spontaneously depolarize is called _____.
- A. resting membrane potential
 - B. depolarization
 - C. threshold
 - D. all or none response

A 58 year old man suffers an injury to the right shoulder during a biking accident. An AP radiograph of the left shoulder reveals a complete dislocation of the shoulder joint. The head of the humerus lies inferior and medial to the glenoid fossa. You perform a physical exam and determine the axillary nerve has been damaged as a result of this injury.

17. This nerve is derived from which spinal nerve roots?
- A. C 2,3
 - B. C 3,4,5
 - C. C 5,6
 - D. C 6,7,8
18. Which one of the following muscles is innervated by this nerve?
- A. teres major m.
 - B. deltoid m.
 - C. supraspinatus m.
 - D. infraspinatus m.
19. Damage to this nerve could produce which of the following motor deficits?
- A. weakness in extension of the forearm at the elbow against resistance
 - B. weakness in flexing the forearm at the elbow against resistance
 - C. weakness in flexion of the carpus and digits
 - D. weakness in lateral rotation of the humerus against resistance
20. Injury to the above nerve would cause this patient to have the most difficulty _____.
- A. adducting the arm at the shoulder joint
 - B. abducting the arm at the shoulder joint
 - C. flexing the carpus and digits
 - D. extending the carpus and digits

21. The above mentioned nerve is derived from the ____ cord of the brachial plexus?
- A. medial
 - B. lateral
 - C. posterior
 - D. inferior

A middle aged woman has been a typist for the past 30 years. She presents to your clinic complaining of a problem with her right forearm and hand. You do your exam and find signs and symptoms consistent with carpal tunnel syndrome.

22. What nerve is involved in this condition?
- A. ulnar nerve
 - B. axillary nerve
 - C. median nerve
 - D. radial nerve
23. This patient described above would most likely be complaining of a burning pins and needles pain where?
- A. posterior hand
 - B. lateral aspect of the palmar surface
 - C. medial aspect of the palmar surface
 - D. anterior forearm
24. The above mentioned nerve is derived from what component(s) of the brachial plexus?
- A. posterior cord
 - B. lateral cord
 - C. medial cord
 - D. two of the above
25. The above nerve is derived from the anterior rami of which of the following spinal nerve roots?
- A. C5,6
 - B. C5,6,7
 - C. C5,6,7,8
 - D. C5,6,7,8,T1
26. Spinal nerves contain _____ fibers.
- A. GSA
 - B. GVA
 - C. GSE
 - D. all of the above
27. The cauda equina is composed of
- A. spinal nerves
 - B. rami communicantes
 - C. dorsal and ventral nerve roots
 - D. none of the above

28. Which spinal nerve emerges from the vertebral canal above its respective vertebra?
- A. L4
 - B. T1
 - C. T12
 - D. C7
29. Which one of the following statements is incorrect concerning the brachial nerve plexus?
- A. It is composed of anterior rami C5 to T1
 - B. It gives rise to the musculocutaneous nerve.
 - C. It gives rise to the median nerve.
 - D. It forms the splanchnic nerves.
30. Cranial nerve VIII is associated with
- A. movement of the tongue
 - B. taste
 - C. balance
 - D. facial expression
31. Which one of the following cranial nerves is both motor and sensory?
- A. CN V
 - B. CN II
 - C. CN VI
 - D. CN XII
32. Taste is carried by cranial nerve
- A. VII
 - B. X
 - C. IX
 - D. all of the above
33. Which cranial nerve emerges from the midbrain?
- A. CN V
 - B. CN I
 - C. CN III
 - D. CN X
34. The postganglionic neurons that innervate the circular muscle of the iris are located in the
- A. nucleus of Edinger Westphal
 - B. otic ganglion
 - C. dorsal motor nucleus of the vagus
 - D. ciliary ganglion

35. Enhanced peristalsis is a function of the
- A. parasympathetic division of the ANS
 - B. sympathetic division of the ANS
 - C. somatic motor system
 - D. all of the above
36. Increased heart rate and blood pressure are a function of the
- A. parasympathetic division of the ANS
 - B. sympathetic division of the ANS
 - C. somatic motor system
 - D. all of the above
37. The adrenal medulla receives visceral innervation from the
- A. parasympathetic division of the ANS
 - B. sympathetic division of the ANS
 - C. both A and B
 - D. none of the above
38. The transverse cervical nerve supplies the
- A. scalp posterior to the ear
 - B. skin over the clavicle
 - C. skin of the lateral and anterior parts of the neck
 - D. skin of the parotid region
39. The skin on the posterior surface of the arm and forearm is innervated by the _____ nerve.
- A. radial
 - B. axillary
 - C. median
 - D. ulnar
40. Sensation to the skin of the cheek and upper lip is carried by
- A. CV VII
 - B. CN IX
 - C. CN VIII
 - D. CN V
41. The diaphragm is innervated by the
- A. phrenic nerves
 - B. intercostal nerves
 - C. subcostal nerves
 - D. all of the above

42. During the development of the sympathetic division of the autonomic nervous system, neural crest cells give rise to the
- A. paravertebral ganglia
 - B. prevertebral ganglia
 - C. terminal ganglia
 - D. all of the above
43. Which one of the following takes its origin from neural crest cells?
- A. pituitary gland
 - B. superior and inferior colliculi
 - C. autonomic ganglia
 - D. pia mater
44. The motor nerve fibers arising from the spinal cord come from neurons in the _____ of the neural tube.
- A. basal plate
 - B. dorsal plate
 - C. neural plate
 - D. alar plate
45. In the human the components of the autonomic nervous system begin to develop around the
- A. second week of gestation
 - B. eight week of gestation
 - C. third week of gestation
 - D. fifth week of gestation
46. Myelinated axons in the peripheral nervous system have an external fibrous covering of connective tissue called the
- A. epineurium
 - B. neurilemma
 - C. perineurium
 - D. endoneurium
47. Myelinated axons in the central nervous system are ensheathed by
- A. epineurium
 - B. perineurium
 - C. endoneurium
 - D. have no sheath
48. The term “chromatolysis” is associated with the process of
- A. nervous system development
 - B. axonal degeneration
 - C. myelination
 - D. axonal regeneration

49. In the peripheral nervous system satellite cells are found in _____ ganglia.
- A. sensory
 - B. intramural
 - C. autonomic
 - D. all of the above
50. During the embryological development of the eye, the outer layer of the optic cup gives rise to the
- A. retinal pigment epithelium
 - B. lens of the eye
 - C. neural retina
 - D. cornea
51. The histological layer of the retina that gives rise to the optic nerve is the
- A. inner plexiform layer
 - B. bipolar cell layer
 - C. ganglion cell layer
 - D. rods and cones layer
52. In the visual pathway optic tract fibers project to the
- A. lateral geniculate nucleus
 - B. ventral posterior lateral nucleus
 - C. ventral posterior medial nucleus
 - D. medial geniculate nucleus
53. In the cochlea the scala vestibuli and scala tympani are continuous with each other at the
- A. modiolus
 - B. helicotrema
 - C. ductus reuniens
 - D. round window
54. In the fourth week of embryonic development there is a thickening of the surface ectoderm that will eventually give rise to the inner ear. This initial thickening is referred to as the
- A. otic vesicle
 - B. optic vesicle
 - C. otic pit
 - D. otic placode
55. The otolith organs for equilibrium are located in the
- A. ampullae of the semicircular canals
 - B. cochlea
 - C. saccule and utricle
 - D. all of the above

56. Denervation of an area of the tongue will cause the taste buds to
- A. hypertrophy
 - B. degenerate
 - C. increase in number
 - D. decrease in size
57. In the olfactory system the olfactory bulb projects to the
- A. olfactory epithelium
 - B. olfactory glomeruli
 - C. thalamus
 - D. olfactory cortex
58. Bones of the skull develop by _____ ossification.
- A. endochondral
 - B. intramembranous
 - C. both
 - D. neither
59. Extensor muscles of the back are derived from the
- A. epimere
 - B. hypomere
 - C. both
 - D. neither
60. Name the structure whose function is essential for individual and species survival and is able to integrate behavior with visceral function thus maintains homeostasis.
- A. Cerebrum
 - B. Thalamus
 - C. Hypothalamus
 - D. None of the above
61. Which sulcus separates the motor cortex from the sensory cortex?
- A. Calcarine
 - B. Parieto – occipital
 - C. Sulcus limitans
 - D. Central
62. Loss of voluntarily controlled movement [fractionation of movement] with paresis results from lesion of this Brodmann's area:
- A. 5, 7
 - B. 3,1,2
 - C. 17
 - D. 4

63. Into which subarachnoid cisterns do the foramina of Luschka and foramen of Magendie open?
- A. Cerebellomedullary
 - B. Interpeduncular
 - C. Pontine
 - D. Superior
64. Which pair form the entry gate of the Basal Ganglia?
- A. Caudate nucleus; Putamen
 - B. Globus pallidus; putamen
 - C. Lentiform nucleus; Globus pallidus
 - D. Nucleus Accumbens; Ventral striatum
65. Which of the following brainstem structure is involved in visual function?
- A. Occipital cortex
 - B. Superior colliculus
 - C. Medial geniculate body
 - D. Two of the above
66. The Special Visceral Efferent nuclei of cranial nerves V & VII are located at this region of the brainstem:
- A. Thalamus
 - B. Midbrain
 - C. Pons
 - D. Medulla Oblongata
67. Which trigeminal nucleus produces 2nd order axons for pain / temperature from the face?
- A. Main Sensory nucleus
 - B. Spinal Trigeminal nucleus
 - C. Mesencephalic nucleus
 - D. Trigeminal ganglion
68. The pathogenesis of this condition involves lesion of the lateral corticospinal tract and anterior horn cells. Name the condition:
- A. Multiple sclerosis
 - B. Guillain Barre
 - C. Amyotrophic lateral sclerosis
 - D. Multiple myeloma
69. What level of the spinal cord lesion would requires artificial support for breathing in an injured patient?
- A. Lesion above C4
 - B. Lesion above T6
 - C. Lesion above S2
 - D. Lesion S2 – S4

70. A small cyst in the central canal of the spinal cord compressing the surrounding neural tissue affects this modality:
- A. Conscious proprioception
 - B. Discriminative touch
 - C. Vibration sense
 - D. Pain / temperature
71. Which cerebral artery supplies most of the lateral surface of the brain?
- A. Anterior cerebral artery
 - B. Middle cerebral artery
 - C. Posterior cerebral artery
 - D. Posterior communicating artery
72. Which pairs of arteries supply the brain tissue
- A. External carotid / Internal carotid
 - B. Internal carotid / Subclavian
 - C. Vertebral / Basilar
 - D. Internal carotid / Vertebral
73. Which artery is involved in Wallenberg's Syndrome?
- A. Posterior cerebral artery
 - B. Anterior Inferior Cerebellar Artery
 - C. Posterior Inferior Cerebellar Artery
 - D. Superior Cerebellar Artery
74. In what location is choroids plexus not found ?
- A. Lateral ventricle
 - B. 4TH Ventricle
 - C. Cerebral Aqueduct of Sylvius
 - D. 3rd Ventricle
75. Which Circumventricular Organ [CVO] is involved with Circadian Rhythm?
- A. Median Eminence
 - B. Area Postrema
 - C. Epithalamus
 - D. Subfornical organ
76. Which of the following is most likely to produce blood-stained CSF?
- A. Epidural hematoma
 - B. Subdural hematoma
 - C. Subarachnoid hematoma
 - D. None of the above.
77. The "goal" of Gastrulation is:
- A. Development of the yolk sac
 - B. Establishment of three germ layers
 - C. Incorporation of the hypoblast into the embryo
 - D. Formation of the secondary brain vesicles

78. Which of the following events occurs during Neurulation?
- A. Formation of cephalic flexure
 - B. Closure of the neuropores
 - C. Elevation of the neural fold
 - D. Two of the above
79. A longitudinal groove on the inner surface of the neural tube separating the alar and the basal plates is called:
- A. Lamina terminalis
 - B. Septum pellucidum
 - C. Linea aspera
 - D. Sulcus limitans
80. Which of the following proliferate to produce neuroblast cells?
- A. Neuroepithelial cells
 - B. Schwann cells
 - C. Satellite cells
 - D. Oligodendrocytes
81. Which of the following is found in the cerebellar cortex?
- A. Pyramidal cell
 - B. Purkinje cell
 - C. Alpha motor neuron
 - D. Schwann cell
82. A typical thoracic vertebrae (**take T6**) articulates with:
- A. Two other vertebrae
 - B. Two other vertebrae and two ribs
 - C. Two other vertebrae and four ribs
 - D. Four ribs, and one vertebrae
83. The atlanto-occipital articulation is classified as a _____ articulation.
- A. Ball and socket
 - B. Condylloid
 - C. Syndesmosis
 - D. Cartilaginous
84. The muscle directly **overlying** the region of the suboccipital triangle and acting as a "roof" for it is the:
- A. rectus capitis posterior minor m.
 - B. serratus posterior superior m.
 - C. trapezius m.
 - D. semispinalis capitis m.

85. A primary function of the **rhomboideus major** muscle is to:
- A. adduct the scapula
 - B. abduct the scapula
 - C. depress the scapula
 - D. extend the scapula
86. Which of the following muscles attaches to the posterior tubercle (spine) of the **atlas**?
- A. rectus capitis posterior major m.
 - B. obliquus capitis inferior m.
 - C. rectus capitis posterior minor m.
 - D. obliquus capitis superior m.
87. The transverse foramen is a feature of the:
- A. cervical vertebrae
 - B. thoracic vertebrae
 - C. lumbar vertebrae
 - D. sacral bone
88. Which of the following **best** describes the insertion of the **longissimus capitis** muscle?
- A. lateral aspect of the inferior nuchal line of the occipital bone
 - B. the body of the mastoid process of the occipital bone
 - C. transverse process of the first cervical and the mastoid process of the temporal bone
 - D. medial one-half of the superior nuchal line
89. Which of the following muscles is the most powerful extensor of the head on the neck?
- A. splenius capitis
 - B. semispinalis cervicis
 - C. longissimus capitis
 - D. semispinalis capitis
90. Which phrase applies to the latissimus dorsi muscle?
- A. inserts into the of the lesser tubercle of the humerus
 - B. is a lateral rotator of the arm
 - C. motor innervation is via the thoracodorsal nerve
 - D. originates from the spinous processes of T1 through T5 only
91. Which structure extends from the apex of the dens to the anterior aspect of the foramen magnum?
- A. Longitudinal ligament of the cruciform ligament
 - B. Apical ligament
 - C. Alar ligament
 - D. Ligamentum flavum

92. What connects the laminae of two adjacent vertebrae?
- A. Longitudinal ligament of the cruciform ligament
 - B. Apical ligament
 - C. Alar ligament
 - D. Ligamentum flavum
93. To count the vertebrae in a person's back, which of the following vertebral levels would be the best place to start?
- A. C1
 - B. C7
 - C. T1
 - D. T12
94. Which of the following vertebrae is atypical?
- A. C1
 - B. C3
 - C. T5
 - D. T6
95. Pedicles in a typical vertebrae have all the following characters, EXCEPT:
- A. They continuous anteriorly with laminae of the vertebral arch
 - B. They form the most lateral aspect of the vertebral arch
 - C. They allow the housing of the both superior and inferior articular fascets
 - D. There are two vertebral notches, one superior and one inferior to each pedicle
96. In the vertebral canal the dural sac can be located at _____ level of vertebrae.
- A. L2
 - B. T12
 - C. L5
 - D. L3
 - E. S2
97. All of the following statements about the intervertebral discs are correct EXCEPT:
- A. They are the chief bonds of connection between the vertebrae
 - B. Their thickness varies in different regions of the vertebral column
 - C. They are thicker posteriorly then anteriorly in the cervical and lumbar regions
 - D. They are composed of anuli fibrosi enclosing gelatinous nuclei pulposi
98. Which of the following ligaments or membranes holds the dens of the axis against the anterior arch of the atlas?
- A. Transverse ligament of the atlas
 - B. Apical ligament of the dens
 - C. Atlanto-occipital membrane
 - D. Membrana tectoria

99. Which of the following muscles is a true or intrinsic back muscle?
- A. Trapezius
 - B. Longissimus
 - C. Latissimus dorsi
 - D. Rhomboideus major
100. Each of the following statements about the erector spinae muscle is correct EXCEPT:
- A. It forms the entire intermediate layer of intrinsic back muscles
 - B. It has a well marked lateral margin that is visible in living people
 - C. It is mainly concerned with flexion of the vertebral column
 - D. It is supplied by the posterior primary rami of spinal nerves
101. Which muscle may be trapped deep in-between the semispinalis capitis and the splenius capitis muscles?
- A. Iliocostalis cervicis
 - B. Longissimus capitis
 - C. Levator scapulae
 - D. Spinalis cervicis
102. Structures that normally prevent herniation of the nucleus pulposus of the IVD include all EXCEPT the:
- A. Ligamentum flavum
 - B. Anterior longitudinal ligament
 - C. Anulus fibrosis
 - D. Posterior longitudinal ligament
103. The lateral crest of the sacrum is the fusion of the _____.
- A. Sacral lamina
 - B. Sacral transverse processes
 - C. Sacral articular processes
 - D. Sacral spinal processes
104. Which of the following statements is CORRECT?
- A. The vertebral canal in the lumbar region, is most likely oval in shape
 - B. In any vertebral bone development, there are 5 primary ossification centers
 - C. Uncovertebral joints are only found at the cervical region of the vertebral vertebrae
 - D. In the midthoracic vertebrae the spinous processes are very short and on the horizontal plane
105. The denticulate ligament is composed of:
- A. Dura mater
 - B. Arachnoid mater
 - C. Pia mater
 - D. coccygeal ligament

106. All of the following statements about the lumbar vertebrae are correct except the:
- A. Relatively large bodies
 - B. Triangular vertebral foramina
 - C. Smaller transverse processes
 - D. Longer and angular spinous processes
107. All of the following ligaments are attached to the sixth cervical vertebra except:
- A. Supraspinous
 - B. Anterior longitudinal
 - C. Intervertebral disc
 - D. Ligamentum flava
108. The prime movers in rotation of the vertebral column are the:
- A. Semispinalis
 - B. Anterior abdominal muscles
 - C. Multifidti and rotators
 - D. Spinal anatomy
109. Viewed from the lateral side, the veterbral column of the newborn infant presents primary curves which can be seen in the x-ray. They are:
- A. Cervical and sacral curves
 - B. Cervical and thoracic curves
 - C. Thoracic and lumbar curves
 - D. Thoracic and sacral curves
110. What function is associated with the scalene muscles?
- A. Extension of the head
 - B. Lateral flexion of the neck
 - C. Lateral extension of the neck
 - D. Forward flexion of the head

**NBCE
MOCK BOARD
QUESTIONS
SPINAL ANATOMY
Answer Key**

1. B
2. A
3. D
4. C
5. A
6. D
7. D
8. B
9. D
10. C
11. D
12. C
13. B
14. B
15. C
16. C
17. C
18. B
19. D
20. B
21. C
22. C
23. B
24. D
25. D
26. D
27. C
28. D
29. D
30. C
31. A
32. D
33. C
34. D
35. A
36. B
37. B
38. C
39. A

40. D
41. D
42. D
43. C
44. A
45. D
46. D
47. C
48. B
49. D
50. A
51. C
52. A
53. B
54. D
55. C
56. B
57. D
58. C
59. A
60. C
61. D
62. D
63. A
64. A
65. B
66. C
67. B
68. C
69. A
70. D
71. B
72. D
73. C
74. C
75. C
76. C
77. B
78. C
79. D
80. A
81. B
82. C
83. B
84. D
85. A

86. C
87. A
88. C
89. D
90. D
91. B
92. D
93. B
94. A
95. A
96. A
97. C
98. A
99. B
100. C
101. B
102. A
103. B
104. A
105. C
106. D
107. A
108. C
109. D
110. B