

Answer Key With Rationales

1) Correct: A. Cervical Enlargement

Reasoning The cervical enlargement contains spinal nerves that innervate the upper limbs as it contains the brachial plexus which contains the motor neurons for the upper limbs.

Wrong Answers B: There is no **thoracic** enlargement. **C:** The **lumbar** enlargement contains the nerves that are associated with the lower limbs. **D:** The **Sacral** enlargement also contains nerves that are associated with the lower limbs and the pelvis.

2) A. Lumbar, Pelvis, Lower

Reasoning Only the **lumbar** enlargement contains nerves that innervate the pelvis and lower limbs.

B: There is no **lower enlargement**, and there are no “lumbar” limbs; **C:** The **pelvic** nerves are in the lumbar enlargement. **D:** There is no **thoracic enlargement**.

3) B. Sacral, Lumbar, Thoracic, Cervical

Reasoning Going from the lowest segment of the spinal cord to the highest segment they are the sacral, lumbar, then thoracic, and finally the cervical. As the cervical is the segment that corresponds to the neck and the spinal cord starts after the brain itself which is inside of the cranium it must be the most superior (or most cranial in regard to the spinal cord segments).

Wrong Answers A: Sacral refers to the most inferior/caudal segment. **C:** The **thoracic** is the second most superior segment as it corresponds to the segment that corresponds to the thoracic cavity that houses the lungs which are inferior to the neck. **D:** The **Lumbar** segment corresponds to the lower back, below its corresponding vertebrae is the sacral vertebrae and the fused coccyx.

4) B. Axon

Reasoning The Axons are long thin tubes that branch off at the end into synaptic terminals that interface with other neurons or another type of tissue.

Wrong Answers A: The **dendrites** are short branch-like structures that come off the perikaryon of the neuron and there are many of them. **C:** The **body** of the neuron is called the perikaryon/soma.

5) B. Ganglia

Reasoning: The **body** of the pseudo-unipolar sensory neurons that hang off to the side and as they are clustered together in the sensory (dorsal spinal nerve roots) they have that easy to identify shape.

Wrong Answers A: The **root** is the whole spinal nerve that connects back to the spinal cord. **C:** The **body** is incorrect as it is asking where the body is contained. **D:** The Axon is the long thin tube that runs the length of the neuron.

6) A. Conus Medullaris

Reasoning: The answer is conus medullaris because it is where the spinal cord starts tapering off at the distal end and its name is because the tapering of the spinal cord gives it a cone-like shape.

Wrong Answers B: The **filum terminale** is at the most distal end of the spinal cord as the word “finale” implies from its name. **C:** The cauda equina is the name for the multi-branching pattern of spinal nerves as they come from the spinal cord and spread across the lower part of the body. **D:** The conus spinus is a made-up thing that when translated from latin roughly translates into “Spiney Cone.”

7) C. Coccygeal ligament

Reasoning: The correct answer is **coccygeal ligament** because it is the only one that describes bone connecting to something other than muscle.

Wrong Answers A: An **aponeurosis** is a broad sheet of tendons. **B:** The **coccyges tendon** is a made-up thing as the word **coccyges** is the plural of coccyx. **D:** The **tendon** is what we call the connective tissue that connects muscle to bone as the spinal cord is not a muscle this answer is wrong.

8) A. 31

Reasoning: There are 31 segments as there are 1 more spinal cord segment than there are vertebrae in the cervical segment.

Wrong Answers B: There are not 2 extra segments. **C:** There is 1 extra segment. **D:** There are not 3 extra segments.

9) C. Both A & B

Reasoning: Spinal nerves are formed from the combination of the dorsal(posterior/rear) and ventral(anterior/front) roots. The ventral roots are motor, and the dorsal are sensory. A way to keep this straight is that “your car has its motor in the front” but “you do not have eyes in the back of your head”

Wrong Answers A & B: They contain 2 roots. **D:** The roots have be serving some function as the gray horns of the spinal cord are either sensory or motor it has to be at least one of the two.

10) E. 31

Reasoning: There is a spinal nerve on each side of the spinal cord segment, but the question is asking for pairs. There are **31 “pairs”** of spinal nerves. As a pair is 2 things together the answer is thus 31.

11) D. Both A & B

Reasoning: Spinal nerves are all mixed nerves meaning that they contain both afferent(sensory) and efferent(motor) nerves.

Wrong Answers: A & B: They contain both. **C:** Endocrine is the name of a major organ system of the body.

- 12) D. axons, endoneurium, fascicles, perineurium, epineurium

Reasoning: The answer is asking for the base unit for the long fibers of the neural tissues. Instead of a **myofibril** as there was in the muscular system here it is the axon. The axon is the largest (in terms of length) part of the **neural cell**. Then following this the arrangement is the same as it was with the muscular system's tissue. **Endo** meaning around, **fascicle** meaning a bundle of fibers, and finally **epi** meaning outside of. The connective tissues this time though have "**neurium**" instead of "**mysium**" as their suffixes. The reason for the change is that **neurium** can be broken into its parts and defined as; **neuri-** meaning relating to nerves, and **-ium** meaning connective tissue. **Mysium** being "**my-**" as in about muscle and **-ium** still meaning connective tissue.

- 13) B. phrenic, thoracic

Reasoning: The **phrenic nerve** is what innervates the diaphragmic muscles and the diaphragm is the muscle that separates the **thoracic** cavity from the abdominal cavity that lies inferiorly to it.

Wrong Answers A: **septum** is the name for a wall dividing a cavity into separate partitions, and the **cervical plexus** does not innervate anything of the **thoracic cavity**. **C:** the **median** nerve is part of the **brachial plexus**. **D:** The **phrenic nerve** is not part of the **cervical plexus**.

- 14) A. median, brachial

Reasoning: the **median** nerve innervates the palm of the hand and is in the **brachial plexus**. With the word **brachial** meaning "of or related to the arm."

Wrong Answers; B: The **phrenic nerve** is in the **thoracic plexus**. **C:** The **median** nerve is not in the **cervical plexus**. **D:** It is also not in the **thoracic plexus**.

- 15) C. Endoneurium

Reasoning: The **endoneurium** is the connective tissue that surrounds bundles of axons.

Wrong Answers; A: the **Perineurium** is surrounding **fascicles**. **B:** The **epineurium** is the most superficial layer. **D:** The **Axonneurium** is a made-up word.

- 16) B. fascicles, perineurium

Reasoning: A **fascicle** is a small bundle and it is surrounded by the **perineurium**.

Wrong Answers; Sarcomeres are the basic contractile unit of muscular tissue.

- 17) B. sciatic, sacral

Reasoning: The **sciatic nerve** is within the **sacral plexus** as it runs on the posterior side of the body through the buttocks muscle and then down the lower limbs.

Wrong Answers; A: It is not in the **lumbar plexus**. **C:** The **femoral** nerve is related to the femur/thigh muscles. **D:** The **median** nerve is in the **brachial plexus**.

18) A. femoral, lumbar

19) A. C1, C4

20) A. Thoracic

21) Lumbar, T12, L5

22) B. Sacral, L4-S4

23) B. Monosynaptic

24) A. Polysynaptic

25) B. Stretch reflex

26) A. Crossed Extensor Reflex

27) D. Babinski

28) A. Coccygeal ligament, Coccyx

29) B. Cervical

30) C. Sacral

31) B. Meningitis, Viral, Bacterial

32) A. Dermatomes

33) A. Denticular ligament

34) C. Cervical

35) D. Both B & C

36) B. The myelin sheath surrounding the axon.

37) C. Subarachnoid

38) A. 3

39) E. A & C & D