

Human Anatomy — Biology 255

Exam #1

Please place your name and I.D. number on the back of the last page of this exam. Final Exams are not returned—if you want to review your final exam please stop by my office sometime during the first two weeks of winter term. All exams will be shredded on the Monday of week 2 of the spring term.

You must answer *all* questions on this exam. Because statistics demonstrate that, on average, between 2-5 questions on every 100-point exam are ambiguous enough to come out "aberrant" on an item analysis, the total number of points possible on this exam is 104. However, grades will be calculated out of a possible 100 points, assuming that 2–3 questions on this exam are aberrant.

Section 1: The anatomy of the *vertebral column* and *true back muscles*. If the following statements are true place a (+) in the space provided; if the statements are false place a (0) in the space provided. (2 points each)

- _____ 1. Spinal nerves exit from the vertebral column by the intervertebral foramina.
- _____ 2. The muscles of the back are divided into multiple layers. The two most superficial layers are muscles that move the upper limbs (most superficial layer) and muscles that are involved in respiration (middle layer). The deepest layer of muscles on the back are the true back muscles.
- _____ 3. The erector spinae muscle group includes the iliocostalis muscles, the longissimus muscles, and the spinalis muscles.
- _____ 4. If you wanted to rotate your trunk to the right you would contract the splenius and the erector spinae muscles on the right side and the transversospinalis muscles on the left side.
- _____ 5. Examination of the vertebral column will demonstrate that there is an intervertebral disc between all presacral vertebrae.
- _____ 6. All of the true back muscle groups have flexion of the vertebral column as one of their actions

- _____ 7. Examination of the vertebral column will demonstrate that a well-trained anatomist can determine which are the superior articulating processes and which are the inferior articulating processes by their orientation. *In general* superior articulating processes face posteriorly while inferior articulating processes face anteriorly.

Section 2: The anatomy of the *spinal cord and spinal nerves*. If the following statements are true place a (+) in the space provided; if the statements are false place a (0) in the space provided. (2 points each)

- _____ 8. The spinal ganglion is found in association with the ventral horn of the spinal cord.
- _____ 9. The filum terminale is a piece of nervous tissue that extends inferiorly from the conus medullaris and helps hold the spinal cord in place by anchoring it to the sacral canal.
- _____ 10. There are 31 pairs of spinal nerves.
- _____ 11. Spinal nerves divide into a dorsal ramus and a ventral ramus. The dorsal ramus provides motor output to and sensory input from the dorsal body wall, while the ventral ramus provides motor output to and sensory input from the rest of the body wall.
- _____ 12. The cauda equina is formed by the exiting spinal nerves due to the inequality of the lengths of the spinal cord and the vertebral column. This inequality of length is due to the fact that the spinal cord stops growing in length before the vertebral column stops growing in length.
- _____ 13. All spinal nerves have a ventral root and a dorsal root.
- _____ 14. The dorsal horn is the location of the somas of the motor neurons that exit the spinal cord.
- _____ 15. The spinal cord is not a straight cylinder; it has two enlargements: cervical enlargement and the lumbosacral enlargement. The cervical enlargement gives rise to the brachial plexus, and the lumbosacral enlargement gives rise to the lumbosacral plexus.

Section 3: The anatomy of the *spinal cord and spinal nerves (continued)*. Answer the following questions using the key below

- a. efferent somatic motor information would be lost
- b. afferent sensory input would be lost
- c. efferent parasympathetic motor output would be lost
- d. efferent sympathetic motor output would be lost
- e. more than one of the above would be lost
- f. all of the above would be lost

- _____ 16. Cutting the spinal nerve of T₆ distal to the gray communicating ramus would result in...
- _____ 17. Cutting the ventral root of spinal nerve C₇ would result in...
- _____ 18. Cutting the ventral root of spinal nerve S₂ would result in...
- _____ 19. Cutting the ventral ramus of spinal nerve C₇ would result in...
- _____ 20. Cutting the spinal nerve S₃ proximal to the gray communicating ramus would result in...
- _____ 21. Cutting the dorsal root of spinal nerve S₃ would result in...
- _____ 22. Cutting the dorsal ramus of spinal nerve S₃ would result in...
- _____ 23. Cutting the spinal nerve of T₆ proximal to the white communicating ramus would result in...
- _____ 24. Cutting the spinal nerve of C₆ proximal to the gray communicating ramus would result in...
- _____ 25. Thinking about all of this cutting has my brain hurting. Collect two free points and put the letter Z in the space provided.

Section 4: Multiple Uglies dealing with the anatomy of the *ANS (Autonomic Nervous System)*. Circle the letter in front of any and all correct statements. (1 point each)

26. The sympathetic nervous system. (8 points)

- a. The sympathetic branch of the autonomic nervous system exits the spinal cord between T₁ and L₂.
- b. The preganglionic neuron of the sympathetic nervous system originates in the lateral horn of the gray matter of the spinal cord.
- c. The preganglionic neurons of the sympathetic nervous system are short and myelinated.
- d. The postganglionic neurons of the sympathetic nervous system are long and unmyelinated.
- e. Preganglionic neurons of the sympathetic branch of the autonomic nervous system exit the spinal nerve by the white communicating ramus and enter the paravertebral sympathetic ganglionic chain that lies on both sides of the vertebral column.
- f. Preganglionic neurons from the upper 5 thoracic spinal nerves ascend within the paravertebral sympathetic ganglionic chain before synapsing with the postganglionic neuron.
- g. All spinal nerves possess a gray communicating ramus which allows the postganglionic neuron of the sympathetic nervous system to enter the spinal nerve.
- h. Not all spinal nerves possess a white communicating ramus.

27. The parasympathetic nervous system (4 points)

- a. The parasympathetic branch of the autonomic nervous system exits the spinal cord between S₁ and S₃.
- b. The preganglionic neuron of the parasympathetic nervous system originates in the lateral horn of the gray matter of the spinal cord.
- c. The preganglionic neurons of the parasympathetic nervous system are long and unmyelinated.
- d. The postganglionic neurons of the parasympathetic nervous system are long and myelinated.

Section 5: Drawing

28. *Draw and label* the brachial plexus. (10 points)

Section 6: *Thoracic cavity and structures.* Answer the following questions by placing the most appropriate letter in the space provided. (NOTE: Place only one letter in the space provided.)

- _____ 29. Which of the following sets of muscles would pass inferiorly and posteriorly as they pass from their origin to their insertion?
- external intercostals
 - internal intercostals
 - subcostals
 - more than one of the above
 - none of the above
- _____ 30. Which of the following statement(s) about the heart and the vessels leading into and branching off of the heart is/are correct?
- the right atrium may be subdivided into the atrium proper and the sinus venarum cavarum
 - the right ventricle is subdivided into the conus arteriosus (near the exit of the pulmonary trunk), with its smooth walls, and the crista supraventricularis, the portion of the right ventricle with rough walls
 - the right ventricle has thinner walls than the left ventricle
 - the right ventricle is subdivided into the conus arteriosus (near the exit of the pulmonary trunk), with its smooth walls, and the crista
 - the atrial septum is a piece of muscular tissue (cardiac muscle) that separates the right and left atria
 - more than one of the above are correct
 - all of the above are correct
 - none of the above are correct
- _____ 31. Which of the following sets of muscles pass inferiorly and anteriorly as they pass from their origin to their insertion?
- external intercostals
 - internal intercostals
 - subcostals
 - more than one of the above
 - none of the above
- _____ 32. Which of the following statement(s) about the right lung is/are incorrect?
- this lung has three lobes that are separated by two fissures
 - the horizontal fissure separates the inferior and middle lobes
 - the right lung does not possess a cardiac notch
 - the right lung is slightly larger than the left
 - more than one of the above are incorrect
 - none of the above are incorrect (all of the above are correct)

- _____ 33. Which of the following sets of muscles would be used in exhaling?
- external intercostals
 - internal intercostals
 - subcostals
 - more than one of the above
 - none of the above
- _____ 34. Which of the following statement(s) about the heart and the vessels leading into and branching off of the heart is/are incorrect?
- most of the left atrium and left ventricle are found on the posterior surface of the heart
 - the superior vena cava and inferior vena cava empty into the right atrium of the heart
 - the brachiocephalic trunk (artery) is the first vessel to branch off of the aorta
 - the pulmonary trunk exits from the right ventricle
 - more than one of the above are incorrect

Section 7: *Coronary circulation.* If the following statements are true place a (+) in the space provided; if the statements are false place a (0) in the space provided. (2 points each)

- _____ 35. The left coronary artery always has three branches.
- _____ 36. If the circumflex branch of the left coronary artery does reach the posterior surface of the heart the left posterior descending coronary artery (also termed the posterior left ventricular branch of the left coronary artery) supplies the left ventricle, left atrium, and right ventricle with blood.
- _____ 37. The posterior interventricular branch of the right coronary artery supplies both ventricles, the interventricular septum and both atria with blood.
- _____ 38. The anterior interventricular branch of the left coronary artery (also termed the left anterior descending coronary artery) supplies the right ventricle, left ventricle, right atrium and the interventricular septum with blood.
- _____ 39. The right marginal branch of the right coronary artery supplies the right atrium, interatrial septum and the left ventricle with blood.
- _____ 40. The circumflex branch of the left coronary artery does not always reach the posterior surface of the left side of the heart.

Section 8: Define the following terms in the space provided. (2 points each)

_____ 41. contralateral

_____ 42. circumduction

_____ 43. meatus

_____ 44. cubitus