Human Anatomy & Physiology I
with Dr. Hubley

Fall 2009 Exam 4

Name: ________________________________________________________

Instructions
This exam consists of 50 questions. You may write on the exam itself, but be sure to answer all your questions on a “Scantron” sheet with a #2 pencil. For each question there is one response that is the best response. You must select the one best response to receive credit for each question. If you select more than one response for a question, then you will receive no credit for that question.

If you fill in a response on the answer sheet and wish to change your response, then be sure to completely erase the errant response. I recommend that you read all responses for a question before selecting your answer. **In fact, you should answer all your questions on this exam, and then fill out your Scantron sheet after you are sure of your answers.**

Be sure to write your name on this exam booklet and on the answer sheet. Turn in both the exam booklet and answer sheet as you leave the testing center. If you believe that a question on this exam is in error or unclear, then you may write comments on the exam booklet or on a separate sheet of paper.
1. Which of the four major regions of the human brain is most responsible for conscious thought?
   a. brain stem
   b. cerebellum
   c. midbrain
   d. cerebrum
   e. diencephalon

2. Which of the four major regions of the human brain is the largest?
   a. brain stem
   b. cerebellum
   c. midbrain
   d. cerebrum
   e. diencephalon

3. Which of the following structures is made primarily of white matter?
   a. precentral gyrus
   b. fornix
   c. temporal lobe
   d. basal nucleus
   e. lateral ventricle

4. A large, deep groove between two portions of the cerebral cortex is a
   a. gyrus.
   b. fornix.
   c. sulcus.
   d. fissure.
   e. meninges.

5. The frontal and temporal lobes are separated by the
   a. lateral sulcus.
   b. longitudinal fissure.
   c. longitudinal sulcus.
   d. parieto-occipital sulcus.
   e. transverse fissure.
6. ______________ is a part of the frontal lobe involved in producing speech?
   a. The postcentral gyrus
   b. Broca’s area
   c. The prefrontal cortex
   d. Wernicke’s area
   e. The insula

7. Samantha was in a car accident, and a portion of her cerebral cortex was damaged. As a result, she is having difficulty hearing. Which part of her cortex was most likely damaged?
   a. precentral gyrus
   b. occipital lobe
   c. insula
   d. frontal lobe
   e. temporal lobe

8. Which of the following structures contains mainly commissural fibers?
   a. corpus callosum
   b. basal nucleus
   c. pons
   d. spinal cord
   e. temporal lobe

9. Axons that connect the left frontal lobe to the right frontal lobe are
   a. association fibers.
   b. commissural fibers.
   c. projection fibers.
   d. All of the responses above are correct.
   e. None of the responses above is correct.

10. One common symptom of Parkinson’s disease is uncontrollable movements of the limbs and head. Which part of the brain appears to be most directly affected by Parkinson’s disease?
    a. basal nuclei
    b. Wernicke’s area
    c. Broca’s area
    d. Parkinson’s area
    e. central sulcus
For questions 11-14, select your answer from the responses, a-d, below.

a. the hypothalamus
b. the thalamus
c. both the hypothalamus and thalamus
d. neither the hypothalamus nor the thalamus

11. Which structure is responsible for filtering auditory stimuli before sending them to the cortex?

12. Which structure is part of the autonomic nervous system?

13. Which structure exerts control over the heart rate?

14. Which structure regulates feelings of hunger?

For questions 15-18, select your answer from the responses, a-e, below. Each response may be used once, more than once, or not at all.

a. medulla oblongata
b. midbrain
c. pons
d. All of the structures above are correct.
e. None of the structures above is correct.

15. Which structure is located superior to the foramen magnum?

16. Which structure includes the tectum?

17. Which structure contains centers that influence both the rate of breathing and the heart rate?

18. Which structure contains axons that travel from the spinal cord to the thalamus?
19. The cerebellum is **directly** connected to the
   a. occipital lobes.
   b. pons.
   c. thalamus.
   d. precentral gyrus.
   e. lateral sulcus.

20. The _____________ is located between the cerebellum and the brain stem.
   a. cerebral aqueduct
   b. fourth ventricle
   c. transverse fissure
   d. lateral sulcus
   e. arbor vitae

21. Which of the following structures is the most superficial?
   a. arachnoid
   b. dural sinus
   c. meningeal layer of the dura mater
   d. periosteal layer of the dural mater
   e. pia mater

22. Which of the following structures is associated with the spinal cord but NOT the brain?
   a. subarachnoid space
   b. dural sinus
   c. epidural space
   d. periosteal layer of the dura mater
   e. More than one of the responses above is correct.

23. Which ventricle lies within the diencephalon?
   a. lateral ventricle
   b. thalamic ventricle
   c. third ventricle
   d. fourth ventricle
   e. cerebral ventricle
24. Which one of the following statements is **NOT** true?
   a. CSF is made from blood by ependymal cells in the choroid plexus.
   b. CSF has less protein than the blood.
   c. CSF forms a cushion around the brain and the spinal cord.
   d. The arachnoid villi return CSF back to the bloodstream.
   e. The amount of CSF produced daily should be much greater than the amount of CSF removed.

25. What makes the “blood-brain barrier” different from other parts of the body?
   a. Capillaries in the brain are tightly sealed.
   b. Capillaries in the brain do not contain red blood cells.
   c. Oxygen and carbon dioxide diffuse freely between the blood and surrounding tissue.
   d. The brain gets its nourishment only from CSF, not from the blood.
   e. Blood fills the ventricles of the brain.

26. The ninth pair of cranial nerves (IX) are the ___________ nerves.
   a. vestibulocochlear
   b. glossopharyngeal
   c. facial
   d. hypoglossal
   e. accessory

27. Which of the following nerves carries sensory information?
   a. trochlear
   b. glossopharyngeal
   c. vagus
   d. hypoglossal
   e. More than one of the responses above is correct.

28. While performing a difficult brain surgery, Dr. Ben Carson accidentally cut one of the patient’s optic nerves. What symptom most likely resulted from Dr. Carson’s mistake?
   a. The patient receives visual sensory information from only one eye.
   b. The patient has difficulty turning and supporting her head.
   c. The patient has difficulty moving one of her eyes.
   d. The patient cannot feel touch on one side of her face.
   e. More than one of the responses above is correct.
29. Which statement below is NOT true?
   a. Somatic motor neurons release acetylcholine.
   b. Acetylcholine released by a somatic motor neuron may excite or inhibit the effector.
   c. The axon of a somatic motor neuron travels all the way from the CNS to the effector.
   d. The effector of a somatic motor neuron is a skeletal muscle fiber.
   e. Bodies of somatic motor neurons can be found in both the brain and the spinal cord.

30. A single spinal nerve may contain axons of somatic motor neurons, parasympathetic motor neurons, and sympathetic neurons.
   a. The statement above is true.
   b. The statement above is false.

31. Which of the following statements is true?
   a. Ganglia of the parasympathetic system are located in the brain and sacral spinal cord.
   b. All visceral motor neuron axons travel through the sympathetic chain ganglia.
   c. Prevertebral ganglia and sympathetic chain ganglia are used by the sympathetic system.
   d. Splanchnic nerves contain parasympathetic axons.
   e. Many parasympathetic pathways do not use postganglionic axons.

32. According to the concept of “dual innervation,” if an effector is stimulated by the sympathetic
   a. then it is also stimulated by the parasympathetic.
   b. then it is also inhibited by the sympathetic.
   c. then it is inhibited by the parasympathetic.
   d. then it is not innervated by the parasympathetic.
   e. Responses “a” and “b” are both correct.

33. Which one of the following effectors is an exception to the concept of “dual innervation”?
   a. iris of the eye
   b. adrenal medulla
   c. smooth muscle of the stomach
   d. salivary gland
   e. More than one of the responses above is correct.
34. Which of the following effects is caused by the sympathetic nervous system?
   a. increased watery secretions of the salivary glands
   b. increased contractions of smooth muscle of the stomach
   c. dilation of bronchioles in the lungs
   d. constriction of the pupils
   e. increased secretions of the gastric glands

35. Blood vessels to the ___________ are dilated by the sympathetic nervous system.
   a. skeletal muscles
   b. stomach
   c. pancreas
   d. kidneys
   e. salivary glands

36. If a person’s vagus nerves were cut, which of the following effects would be most likely?
   a. decreased heart rate
   b. decreased secretions by sweat glands
   c. decreased contractions of smooth muscle of the stomach
   d. constriction of the bronchioles
   e. increased secretions of digestive enzymes of the pancreas

37. For the brain to send a parasympathetic signal to the heart, the signal from the brain to the heart must travel through
   a. the vagus nerve.
   b. the spinal cord.
   c. a sacral spinal nerve.
   d. Responses “a” and “b” are correct.
   e. Responses “b” and “c” are correct.

38. For the brain to send a sympathetic signal to the rectum, the signal from the brain to the rectum must travel through
   a. the vagus nerve.
   b. the spinal cord.
   c. a sacral spinal nerve.
   d. Responses “a” and “b” are correct.
   e. Responses “b” and “c” are correct.
39. For the brain to send a parasympathetic signal to the urinary bladder, the signal from the brain to the bladder must travel through
   a. the vagus nerve.
   b. the spinal cord.
   c. a sacral spinal nerve.
   d. Responses “a” and “b” are correct.
   e. Responses “b” and “c” are correct.

40. For the brain to send a sympathetic signal to the iris of the eye, the signal from the brain to the iris must travel through
   a. a cranial nerve.
   b. a thoracic or lumbar spinal nerve.
   c. a sacral spinal nerve.
   d. Responses “a” and “b” are correct.
   e. Responses “b” and “c” are correct.

41. Preganglionic neurons that carry sympathetic signals to the stomach synapse with postganglionic neurons in the prevertebral ganglia. Given this fact, which of the following statements is also true?
   a. These preganglionic neurons also synapse in the sympathetic chain.
   b. Axons of these preganglionic neurons pass through the sympathetic chain without synapsing.
   c. Axons of these preganglionic neurons do not enter the sympathetic chain.
   d. These preganglionic neurons release norepinephrine.
   e. There are no sympathetic pathways to the stomach.

42. Which of the following characteristics of the adrenal medulla is different from all other autonomic effectors?
   a. It is innervated only by the sympathetic nervous system.
   b. It is an endocrine gland.
   c. The pathway between it and the CNS requires only one visceral motor neuron.
   d. It is stimulated by acetylcholine.
   e. It is an effector.

43. Which of the following cells does NOT have nicotinic receptors for acetylcholine?
   a. skeletal muscle fiber
   b. ganglionic (also called postganglionic) neuron of the sympathetic
   c. ganglionic (also called postganglionic) neuron of the parasympathetic
   d. cardiac muscle cell
44. Which of the following effectors will be inhibited by muscarinic receptors?
   a. smooth muscle of stomach
   b. cardiac muscle
   c. salivary gland
   d. pancreas
   e. More than one of the responses above is correct.

45. Binding of norepinephrine to __________ receptors causes constriction of blood vessels to the kidneys.
   a. alpha
   b. beta
   c. muscarinic
   d. nicotinic
   e. Responses “a” and “c” are both correct.

46. Binding of norepinephrine to __________ receptors causes dilation of the bronchioles.
   a. alpha
   b. beta
   c. muscarinic
   d. nicotinic
   e. Responses “a” and “c” are both correct.

Go to the next page to see questions 47 through 50.
For questions 47-50 refer to the diagram below.

***If more than one of the letters is correct, then select “e”!!!