NAME:_____
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NEUROSCIENCE
EXAMPLE EXAM 3
FALL 2011

Multiple Choice: **Read the <u>entire question</u> and <u>all answers</u> before choosing (circle the letter) <u>the one best answer</u>.**

1. The ganglion composed of the cell bodies that innervate the hair cells of the cochlea is called the _____.
   a) basilar ganglion
   b) Reissner's ganglion
   c) Spiral ganglion
   d) Scarpa's ganglion
   e) None of the above

2. The organ of Corti is located in the _____ of the inner ear.
   a) scala media
   b) scala tympani
   c) scala vestibuli
   d) round window

3. The medial lemniscus _____.
a) is composed of the axons from neurons in the dorsal column nuclei.
b) is composed of axons that synapse on neurons in the medial part of ventral posterior nucleus of the thalamus.
c) is where the axons from neurons in the motor cortex decussate before continuing into the spinal cord.
d) Both a and b

4. The pathway that conveys pain and temperature information to the primary sensory cortex _____.
a) has primary afferent axons that synapse on neurons in the substantia gelatinosa of the dorsal horn.
b) is called the spinothalamic pathway.
c) includes neurons in the lateral part of the ventral posterior nucleus and the intralaminar nuclei of the thalamus.
d) All of the above
e) Only a and b

5. You suffer a lesion to your posterior parietal cortex that causes you to have astereognosia. This lesion would leave you _____.

a) unable to feel painful stimuli
b) unable to recognize common objects by touch
c) unable to recognize common objects by visual inspection
d) unable to sense the position of your limbs when you closed your eyes
e) unable to recognize half of your body as belonging to you.

6. Which of the following is/are **TRUE** regarding auditory cortex?

a) It is located on the supratemporal gyrus of the temporal lobe.
b) It has summation columns in which the neurons respond best to binaural inputs.
c) The isofrequency bands are arranged such that the neurons in the anterior part of auditory cortex respond best to low frequency sounds.
d) Both a and b
e) Both a and c
f) a, b and c are all true

7. Which of the following statements is/are **TRUE**?

a) High frequency sounds vibrate the part of the basilar membrane that is nearer the apex.
b) The normal human ear detects sounds confined to the frequency range of 20-200Hz.
c) Hair cells hyperpolarize when the cilia on the apical surface are displaced towards the smaller cilia.
d) Both a and b are true
e) Both a and c are true

8. The medial superior olive codes _____, where as the lateral superior olive codes _____.

a) interaural time differences, interaural intensity differences
b) interaural intensity differences, interaural time differences
c) auditory reflexes, pattern recognition
d) pattern recognition, auditory reflexes
e) auditory reflexes, visual reflexes

9. The perilymph of the membranous labyrinth:

a) is high in K^+ and low in Na^+
b) is found in the scala media
c) is found in the scala tympani
d) both a and b
e) both a and c

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10. The striatum _____.
    a) receives input from the dorsal column nuclei.
    b) is found in the medial part of the cerebellum
    c) is part of the limbic system
    d) is part of the basal ganglia
    e) none of the above

11. A motor unit consists of _____.
a) one motor neuron and all the muscle fibers it innervates
b) one motor nerve and the skeletal muscles it innervates
c) one motor neuron axon collateral and the muscle fiber it innervates
d) one motor neuron and all of the muscles it innervates

12. A person with damage to the right posterior parietal cortex will most like experience which of the following?
a) Difficulty understanding spoken language
b) Difficulty working a mathematical problem
c) Difficulty identifying common objects by touch
d) Both a and b
e) Both b and c

13. Which of the following is/are **TRUE** regarding the cerebral cortex?
a) There are multiple somatotopic maps on the primary sensory cortex, each devoted to a different sensory receptor type.
b) The neurons in the suppression columns of primary auditory cortex respond best to input from one ear.
c) Area 3a projects to areas 4 and 6.
d) All of the above are true
e) Both a and b are true
f) Both b and c are true
g) Both a and c are true

14. With regard to the pontine reticulospinal tract:
    a) Activity in this tract serves to keep α motor neurons locked into anti-gravity spinal reflex circuits.
    b) To carry out a voluntary movement the motor cortex increases activity in this tract while decreasing activity in the medullary reticulospinal tract.
    c) Axons in this tract synapse bilaterally on α motor neurons in the spinal cord.
    d) All of the above are true regarding the pontine reticulospinal tract.
    e) None of the above are true regarding the pontine reticulospinal tract.

15. Which of the following is/are **TRUE** regarding thermoreceptors:
    a) They are found in the hypothalamus, spinal cord, and skin.
    b) Cold thermoreceptors respond best to changes in temperatures below 35^{o}C.
    c) They exhibit sensory adaptation, in which they respond strongly to changes in temperature, but gradually stop responding if the temperature remains constant.
    d) All of the above (a-c) are true.
    e) Both a and b are true
    f) Both a and c are true.

16. Which of the following is/are **TRUE** of the vestibular system?
    a) When you rotate your head to the left the hair cells in the left horizontal canal crista are depolarized, and those in the right horizontal canal crista are hyperpolarized.
    b) The vestibulo-ocular reflex allows you to maintain visual focus on a target during head movements.
    c) The anterior canal of one ear is functionally paired with the posterior canal of the opposite ear.
    d) All of the above are true.
    e) Only b and c are true

17. Gamma motor neurons:
    a) innervate the Golgi Tendon Organs
    b) innervate smooth muscle
    c) are located outside the spinal cord in autonomic ganglia.
    d) are co-activated along with the alpha motor neurons during a voluntary muscle contraction.
    e) both b and c
    f) b and d
    g) b, c, and d

18. Which of the following is/are **TRUE** with regard to sympathetic division of the autonomic nervous system:
a) It prepares the body for digestive processes
b) Its postganglionic neurons use norepinephrine as their neurotransmitter
c) Its postganglionic neurons use acetylcholine as their neurotransmitter
d) both a and b are true
e) both a and c are true

19. Which of the following applies to the amygdala?
a) It is part of the hypothalamus
b) Bilateral ablation of it results in a decrease in the normal expression of fear.
c) It is part of the temporal lobe.
d) Only a and b apply.
e) Only b and c apply.

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Matching:

From the list below select the word that best matches the numbered item and place the letter next to the numbered item. Not all words in the list are used, and some may be used more than once. Each question is worth 2 points.

a) Aα fibers
b) Aβ fibers
c) Aδ fibers
d) C fibers

_A__ 20. innervate muscle proprioceptors.

_D__ 21. are unmyelinated and innervate pain receptors.

_B__ 22. innervate touch receptors of the skin.

_C__ 23. Small diameter, lightly myelinated axons that innervate temperature receptors.

_B__ 24. Have the second fast action potential conduction velocity of the choices given.

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Short Answer and Essay Questions:

Define the following terms:

Perilymph:
Agnosia:
Intrafusal muscle fiber:
Gamma motor neuron:
Postganglionic neuron:
Affective aggression:

Describe the parts of the brain that make up Papez circuit.

Name and describe the functions of the tracts that comprise the ventromedial pathway.

Name and describe the functions of the tracts that comprise the lateral pathway.

List and provide a function for each of the connections made by the vestibular nuclei of the medulla oblongata with other neural centers in the CNS.

Trace the auditory pathways naming all ganglia, nuclei, neural centers, and tracts leading from the hair cells in the cochlea to the auditory cortex

Trace the pathways by which light touch and pain sensation reach the primary sensory cortex naming all ganglia, nuclei, neural centers, and tracts leading from the receptors to the cortex.