Chapter 12: Nervous System III: Senses
Multiple Choice Questions

1. Receptors for the general senses are found
   A. in a few clusters.
   B. only in the integumentary system.
   C. widely distributed throughout the body.
   D. throughout the visceral organs.

   Bloom’s Level: 1. Remember
   Learning Outcome: 12.01
   Shier – Chapter 12 #1
   Topic: Nervous System

2. Receptors for the special senses are found
   A. primarily in the head.
   B. throughout the integumentary system.
   C. in the fingertips.
   D. in internal organs.

   Bloom’s Level: 1. Remember
   Learning Outcome: 12.01
   Shier – Chapter 12 #2
   Topic: Nervous System

3. The brain interprets input from sensory receptors as
   A. reception.
   B. sensation.
   C. perception.
   D. contraception.

   Bloom’s Level: 1. Remember
   Learning Outcome: 12.02
   Shier – Chapter 12 #3
   Topic: Nervous System
4. Sensory receptors include
   A. mechanoreceptors.
   B. chemoreceptors.
   C. photoreceptors.
   D. all of the above.

_Bloom’s Level: 1. Remember_
_Learning Outcome: 12.02_
_Shier – Chapter 12 #4_
_Topic: Nervous System_

5. The ability to ignore your socks around your ankles demonstrates
   A. general adaptation.
   B. receptor integration.
   C. interpretive assimilation.
   D. sensory adaptation.

_Bloom’s Level: 3. Apply_
_Learning Outcome: 12.02_
_Shier – Chapter 12 #5_
_Topic: Nervous System_

6. The sequence of information flow in response to biting into a slice of pizza is
   A. perception, sensation, impulse send to CNS, sensory receptors activated.
   B. sensory receptors activated, impulse sent to CNS, sensation, perception.
   C. impulse sent to CNS, sensory receptors activated, perception, sensation.
   D. impulse sent to CNS, sensory receptors activated, sensation, perception.

_Bloom’s Level: 3. Apply_
_Learning Outcome: 12.02_
_Shier – Chapter 12 #6_
_Topic: Nervous System_

7. Max returns to his dorm room late at night to find his roommate throwing up. The
   smell is at first so bad that Max wants to vomit too, but after helping his roommate
   clean up, the odor seems to fade. Max has experienced
   A. damage to his sensory receptors.
   B. sensory adaptation.
   C. a response to the decreasing concentration of odorant molecules in the room.
   D. a hallucination.

_Bloom’s Level: 3. Apply_
_Learning Outcome: 12.02_
8. Sensory impulses are stimulated at receptors by
   A. neurotransmitters.
   B. decreasing permeability of nerve cell membranes.
   C. subthreshold potential.
   D. local changes in their cell membrane potentials.

Bloom’s Level: 2. Understand
Learning Outcome: 12.02

9. Olfactory receptors, which provide the sense of smell, are
   A. thermoreceptors.
   B. mechanoreceptors.
   C. chemoreceptors.
   D. proprioceptors.

Bloom’s Level: 2. Understand
Learning Outcome: 12.02

10. A sensation is ______, and projection of a sensation is the ______.
    A. the stimulation of a receptor cell; transmission of an impulse into the brain
    B. a feeling that results from sensory stimulation; brain causing it to seem to come from the receptors being stimulated
    C. a good feeling from a stimulation; right side of the brain projecting the sensation to the left side, or vice versa
    D. a change in membrane permeability of a receptor; transmission of an impulse into a sensory area of the brain

11. Which of the following are paired correctly?
    A. Baroreceptors-stimulated by blood pressure changes
    B. Pain receptors-stimulated by damage to tissues
C. Thermoreceptors-stimulated by temperature changes  
D. All of the above

Bloom’s Level: 1. Remember  
Learning Outcome: 12.02  
Shier – Chapter 12 #11  
Topic: Nervous System

12. Henry has hereditary sensory and autonomic neuropathy. He lacks  
A. chemoreceptors.  
B. nociceptors.  
C. mechanoreceptors.  
D. baroreceptors.

Bloom’s Level: 3. Apply  
Learning Outcome: 12.03  
Shier – Chapter 12 #12  
Topic: Nervous System

13. The war veteran experiences an intense burning sensation seeming to come from where his foot had been amputated. He most likely has  
A. hereditary sensory and autonomic neuropathy.  
B. post traumatic stress disorder.  
C. reflex sympathetic dystrophy.  
D. anosmia.

Bloom’s Level: 3. Apply  
Learning Outcome: 12.03  
Shier – Chapter 12 #13  
Topic: Nervous System

14. Another name for pain receptors is  
A. tactile corpuscles.  
B. lamellated corpuscles.  
C. nociceptors.  
D. mechanoreceptors.

Bloom’s Level: 1. Remember  
Learning Outcome: 12.03  
Shier – Chapter 12 #14  
Topic: Nervous System
15. Pain impulses are first processed in the
   A. gray matter of the posterior horn.
   B. motor cortex of the cerebrum.
   C. dorsal root ganglion.
   D. cerebral cortex.

*Bloom’s Level: 2. Understand
Learning Outcome: 12.03
Shier – Chapter 12 #15
Topic: Nervous System

16. Fibers of the spinothalamic tract transmit pain and temperature information to the
   A. hypothalamus.
   B. cerebellum
   C. brainstem.
   D. thalamus.

*Bloom’s Level: 1. Remember
Learning Outcome: 12.03
Shier – Chapter 12 #16
Topic: Nervous System

17. A pole vaulter keeps track of his position in mid-air through
   A. lamellated corpuscles.
   B. pain receptors.
   C. proprioceptors.
   D. baroreceptors.

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Bloom’s Level: 3. Apply
Learning Outcome: 12.03
Shier – Chapter 12 #17
Topic: Nervous System

18. Pain receptors differ from other somatic receptors by
   A. being stimulated only when pain comes from skeletal muscle.
   B. adapting very little, if at all.
   C. not being able to project impulses back to their origin.
   D. adapting much more than other receptors.

*Bloom’s Level: 1. Remember
Learning Outcome: 12.03
Shier – Chapter 12 #18
Topic: Nervous System
19. Temperature senses use two types of
   A. chemoreceptors.
   B. proprioceptors.
   C. tactile corpuscles.
   D. free nerve endings.

*Bloom’s Level: 1. Remember*
*Learning Outcome: 12.03*
*Shier – Chapter 12 #19*
*Topic: Nervous System*

20. Pain receptors
   A. respond to factors that can damage tissue.
   B. adapt rapidly.
   C. are among the most specialized receptors.
   D. are widely distributed in the brain.

*Bloom’s Level: 2. Understand*
*Learning Outcome: 12.02*
*Shier – Chapter 12 #20*
*Topic: Nervous System*

21. The Golgi tendon organ is stimulated more when
   A. muscles are metabolically active and produce oxygen.
   B. muscle tension increases.
   C. muscle tension decreases.
   D. muscle tension stays the same.

*Bloom’s Level: 2. Understand*
*Learning Outcome: 12.03*
*Shier – Chapter 12 #21*
*Topic: Nervous System*

22. As a result of the tympanic reflex,
   A. the bridge of auditory ossicles becomes less rigid.
   B. vibrations are transmitted more effectively to the inner ear.
   C. the malleus is pulled toward the eardrum.
   D. vibrations are transmitted less effectively to the inner ear.

*Bloom’s Level: 2. Understand*
*Learning Outcome: 12.04*
*Shier – Chapter 12 #22*
*Topic: Nervous System*
23. Taste receptors are
   A. found only on the tongue.
   B. unable to divide.
   C. modified connective tissue cells.
   D. modified epithelial cells.

Bloom’s Level: 2. Understand
Learning Outcome: 12.04
Shier – Chapter 12 #23
Topic: Nervous System

24. Which of the following is not a primary taste sensation?
   A. Sweet
   B. Salty
   C. Pungent
   D. Sour

Learning Outcome: 12.04
Shier – Chapter 12 #24
Topic: Nervous System

25. The hearing receptors are most closely associated with the
   A. ampulla.
   B. spiral organ.
   C. utricle.
   D. saccule.

Bloom’s Level: 1. Remember
Learning Outcome: 12.04
Shier – Chapter 12 #25
Topic: Nervous System

26. The range of human hearing is about
   A. 2,000-3,000 vibrations per second.
   B. 2,000-200,000 vibrations per second.
   C. 20-20,000 vibrations per second.
   D. 2-2,000 vibrations per second.

Bloom’s Level: 1. Remember
Learning Outcome: 12.04
Shier – Chapter 12 #26
Topic: Nervous System
27. Which of the following is part of the inner tunic of the eye?
   A. Retina
   B. Cornea
   C. Choroid coat
   D. Sclera

*Bloom’s Level: 1. Remember
Learning Outcome: 12.04
Shier – Chapter 12 #27
Topic: Nervous System*

28. The lens of the eye thickens when the
   A. suspensory ligaments pull on the lens capsule.
   B. ciliary processes relax.
   C. ciliary muscles relax.
   D. ciliary muscles contract.

*Bloom’s Level: 2. Understand
Learning Outcome: 12.04
Shier – Chapter 12 #28
Topic: Nervous System*

29. Visual sensations from images focused on the side of the retina are blurred because
   A. there are no rods in this region.
   B. there are more cones than rods in this region.
   C. there are more rods than cones in this region.
   D. the optic disc is located on the side of the retina.

*Bloom’s Level: 2. Understand
Learning Outcome: 12.04
Shier – Chapter 12 #29
Topic: Nervous System*

30. The color receptors in the retina are most sensitive to light waves that are
   A. red, green, and blue.
   B. red, blue, and yellow.
   C. green, yellow, and purple.
   D. orange, green, and purple.

*Bloom’s Level: 2. Understand
Learning Outcome: 12.04
31. Stereoscopic vision results when the
   A. images in both eyes are identical.
   B. images in the eyes are different.
   C. rods of one eye are stimulated and the cones of the other eye are stimulated.
   D. brain interprets the images in two dimensions.

32. Arnold enters a darkened movie theater on a sunny summer afternoon. It takes many
    minutes for his eyes to adapt to the darkness because
    A. it takes some time for the retina to rebuild its rhodopsin stores from opsin and retinal.
    B. the rods in the eye work only in bright light, and it takes time for the cones to work
       in weak light.
    C. the iris takes time to close after being subjected to bright light.
    D. the optic nerve fatigues in bright light, and it takes time to recover.

33. Rhodopsin is found in ____ cells.
    A. cone
    B. lens
    C. rod
    D. olfactory receptor

34. Light is refracted when it passes
    A. between media of the same optical density.
    B. into glass at a right angle.
C. between media of different optical densities at a right angle.
D. between media of different optical densities at an oblique angle.

Bloom’s Level: 2. Understand
Learning Outcome: 12.04
Shier – Chapter 12 #34
Topic: Nervous System

35. As they extend from the retina to the brain, the nerve fibers
   A. from the nasal half of each retina cross over.
   B. from the temporal half of each retina cross over.
   C. all cross over.
   D. do not cross over.

Bloom’s Level: 2. Understand
Learning Outcome: 12.04
Shier – Chapter 12 #35
Topic: Nervous System

36. Anosmia is loss of
   A. taste.
   B. smell.
   C. hearing.
   D. vision.

Bloom’s Level: 2. Understand
Boxed Reading: Clinical Application 12.3
Shier – Chapter 12 #36
Topic: Nervous System

37. If you were a physician evaluating a young person who has conductive deafness, which of the following would you consider in your differential diagnosis?
   A. A torn tympanic membrane
   B. A brain tumor
   C. Damage to the auditory nerve
   D. Use of the antibiotic drug streptomycin

Bloom’s Level: 3. Apply
Learning Outcome: 12.04
Shier – Chapter 12 #37
Topic: Nervous System

38. If a person’s right visual cortex is damaged, the injury will most likely affect vision from the
A. right eye only.
B. left eye only.
C. nasal side of one eye and the temporal side of the other eye.
D. nasal side of both eyes.

Bloom’s Level: 3. Apply
Learning Outcome: 12.04
Shier – Chapter 12 #38
Topic: Nervous System

39. The taste receptor that amino acids such as glutamic acid activate is
   A. sour.
   B. salty.
   C. bitter.
   D. umami.

Bloom’s Level: 1. Remember
Learning Outcome: 12.04
Shier – Chapter 12 #39
Topic: Nervous System

40. Bitter receptors sense
   A. alkaloids.
   B. acids.
   C. inorganic salts.
   D. carbohydrates.

41. Jenny slurps up a plate of beef lo mein at a Chinese restaurant. “That tastes great, but I
can’t quite describe it.” What type of taste sensation is she experiencing?
   A. Paprika
   B. Umami
   C. Starch
   D. Pepper
42. Movement of hair cells in the semicircular canals signals
   A. sound waves to the brain.
   B. the direction of motion.
   C. the frequency of the sound.
   D. the velocity of the movement.

*Bloom’s Level: 2. Understand
Learning Outcome: 12.04
Shier – Chapter 12 #42
Topic: Nervous System*

43. Treatment for cataract is usually removal of the
   A. cornea.
   B. sclera.
   C. lens.
   D. vitreous humor.

*Bloom’s Level: 3. Apply
Learning Outcome: 12.05
Shier – Chapter 12 #44
Topic: Nervous System*

44. Glaucoma is usually caused by
   A. clouding of the lens.
   B. clouding of the lens capsule.
   C. accumulation of vitreous humor.
   D. accumulation of aqueous humor.

*Bloom’s Level: 2. Understand
Learning Outcome: 12.05
Shier – Chapter 12 #45
Topic: Nervous System*

45. Farsightedness after the age of forty-five is most likely caused by
   A. loss of lens capsule elasticity.
   B. shortening of the eyeball.
   C. lengthening of the eyeball.
   D. changes in curvature of the cornea.

*Bloom’s Level: 5. Evaluate
Boxed Reading: Clinical Application 12.6
46. A person who is colorblind lacks
   A. retinas.
   B. one type of photopigment.
   C. corneas.
   D. a gene that encodes the proteins in rod cells.

*Bloom’s Level: 2. Understand*
*Boxed Reading: Vignette*

47. The painkiller sold as Ziconotide comes from a
   A. bacterium.
   B. fungus.
   C. snail.
   D. plant.

*Bloom’s Level: 1. Remember*
*Boxed Reading: Clinical Application 12.1*

48. Opiate drugs used to treat pain come from a
   A. bacterium.
   B. fungus.
   C. snail.
   D. plant.

*Bloom’s Level: 1. Remember*
*Boxed Reading: Clinical Application 12.1*

49. Lorelei thinks of the days of the week and months of the year as particular colors. She has
   A. synesthesia.
   B. neuropathy.
   C. a deficiency of neurons in her visual cortex.
   D. too few synapses in her hypothalamus.

*Bloom’s Level: 3. Apply*
*Boxed Reading: Clinical Application 12.2*
Smell and taste disorders may be caused by
A. a side effect of a drug.
B. allergies.
C. a head injury.
D. all of the above.

A cochlear implant treats
A. a torn tympanic membrane.
B. otosclerosis.
C. conductive deafness.
D. sensorineural deafness.

Otosclerosis affects the
A. tympanic membrane.
B. auditory ossicles.
C. cochlea.
D. auditory nerve.

A curvature defect of the lens or cornea in which some parts of an image are in focus on the retina and other parts are blurred and vision is distorted is called
A. presbyopia.
B. astigmatism.
C. hyperopia.
D. myopia.
True / False Questions

54. General senses result from stimulation of receptors in the head only.
   FALSE

55. Sensory receptors are specialized cells or multicellular structures that collect information from the environment and stimulate neurons to send impulses along sensory fibers to the brain, where the cerebral cortex forms a perception.
   TRUE

56. Receptors that are stimulated by changes in chemical concentrations are called thermoreceptors.
   FALSE

57. Stretching of tissues can cause pain sensations to arise from visceral organs.
   TRUE
58. Referred pain occurs when the brain projects the sensation back to the original source in the body from which the pain originated.  
**FALSE**

59. The stapes transmit vibrations to the round window of the inner ear.  
**FALSE**

60. The utricle and saccule contain the sensory receptors associated with the sense of dynamic equilibrium.  
**FALSE**

61. The conjunctiva is a layer of tissue that lines the inner surface of the eyelids and covers most of the anterior surface of the eye.  
**TRUE**

62. The auditory ossicles are in the inner ear.  
**FALSE**
63. Tears contain an enzyme that reduces the risk of eye infection.

**TRUE**

64. When the radial muscles of the iris contract, the diameter of the pupil decreases.

**FALSE**

65. When all three sets of cones are stimulated, a person senses white light.

**TRUE**

66. The taste of food is the same, whether a person has a respiratory infection or not.

**FALSE**

67. The optic disc is medial to the fovea centralis and is the site from which nerve fibers from the retina leave the eye and become part of the optic nerve.

**TRUE**
68. Rods are more sensitive to light than cones, but cones are important for color vision.  
**TRUE**

69. Impulses from taste receptors can travel in the facial, glossopharyngeal, and vagus nerves.  
**TRUE**

70. Sound vibrations are conducted from the malleus to the stapes to the incus.  
**FALSE**

71. Impulses from the spiral organ travel on the vestibulocochlear nerve.  
**TRUE**

72. Optic nerve fibers cross over in the thalamus.  
**FALSE**
73. Light breaks down rhodopsin.  
   **TRUE**

*Bloom’s Level: 2. Understand*  
*Learning Outcome: 12.04*  

74. Floaters are bowel movements that float due to a fatty diet.  
   **FALSE**

*Bloom’s Level: 2. Understand*  
*Learning Outcome: 12.05*  

75. Colorblindness is inherited.  
   **TRUE**

*Bloom’s Level: 2. Understand*  
*Boxed Reading: Vignette*  

76. A person who associates sounds with tastes has synesthesia.  
   **TRUE**

*Bloom’s Level: 2. Understand*  
*Boxed Reading: Clinical Application 12.2*  

77. In hyperopia, the eyeball is too short and the focal point is in front of the retina.  
   **FALSE**

*Bloom’s Level: 2. Understand*  
*Boxed Reading: Clinical Application 12.6*  

78. In astigmatism the cornea or the lens is elliptically rather than spherically curved.  
**TRUE**

Bloom’s Level: 2. Understand  
Boxed Reading: Clinical Application 12.6  
Shier – Chapter 12 #80  
Topic: Nervous System

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**Fill in the Blank Questions**

79. Receptors stimulated by changes in temperature are called ____________  
thermoreceptors

Bloom’s Level: 1. Remember  
Learning Outcome: 12.02  
Shier – Chapter 12  
Topic: Nervous System

80. The process by which the brain causes a sensation to seem to come from the stimulated receptors is called ____________ .  
projection

Bloom’s Level: 1. Remember  
Learning Outcome: 12.02  
Shier – Chapter 12  
Topic: Nervous System

81. Pain that feels like it is coming from a part other than the part being stimulated is called ____________ pain.  
referred

Bloom’s Level: 1. Remember  
Learning Outcome: 12.03  
Shier – Chapter 12  
Topic: Nervous System

82. The __________ is the ossicle that transmits vibrations to the inner ear through the oval window.  
stapes

Bloom's Level: 1. Remember  
Learning Outcome: 12.04
83. The transparent, anterior portion of the eye’s outer tunic is called the ________.
   cornea

84. The adjustment of the thickness of the lens to make close vision possible is called
   ____________.
   accommodation

85. The ________ _________ muscle rotates the eye away from the midline.
   lateral rectus