

Sensory System

chapter

13

Answer Key: Textbook page references are provided as a guide for answering these questions. A complete answer key was provided for your instructor.

OBJECTIVES

1. State the functions of the sensory system.
2. Define the five types of sensory receptors.
3. Describe the four components involved in the perception of a sensation and two important characteristics of sensation.
4. Describe the five general senses.
5. Describe the special senses of smell and taste.
6. Describe the sense of sight, including:
 - Describe the structure of the eye.
 - Explain the movement of the eyes.
 - Describe how the size of the pupils changes.
7. Describe the sense of hearing, including:
 - Describe the three divisions of the ear.
 - Describe the functions of the parts of the ear involved in hearing.
 - Explain the role of the ear in maintaining the body's equilibrium.

4. _____ Receptors stimulated by light
5. _____ Receptors stimulated by tissue damage; also called *pain receptors*
6. _____ Receptors stimulated by changes in temperature

MATCHING

General Senses

Directions: Match the following terms to the most appropriate definition by writing the correct letter in the space provided. Some terms may be used more than once. See text, pp. 233-236.

- | | |
|----------------|-------------------|
| A. pain | D. pressure |
| B. temperature | E. proprioception |
| C. touch | |

1. _____ Nociceptors for this are free nerve endings that are stimulated by tissue damage (caused by chemicals, ischemia, distention, or distortion).
2. _____ Refers to the sense of orientation or position (allows you to locate a body part without looking at it)
3. _____ Heat and cold receptors detect this.
4. _____ Tactile receptors detect this.
5. _____ Receptors for this are located in subcutaneous tissue and in the deep tissue.
6. _____ Sensation you feel if you immerse your hand in boiling water
7. _____ Sensation you feel if a tiny insect crawls along your hairy arm

Part I: Mastering the Basics

MATCHING

Receptors

Directions: Match the following terms to the most appropriate definition by writing the correct letter in the space provided. See text, pp. 231-233.

- | | |
|-------------------|---------------------|
| A. receptor | D. thermoreceptors |
| B. photoreceptors | E. nociceptors |
| C. chemoreceptors | F. mechanoreceptors |

1. _____ Receptors stimulated by changes in pressure or movement of body fluids
2. _____ A specialized area of a sensory neuron that detects a specific stimulus
3. _____ Receptors stimulated by chemical substances

MATCHING**The Eye**

Directions: Match the following terms to the most appropriate definition by writing the correct letter in the space provided. Some terms may be used more than once. See text, pp. 239-242.

- | | |
|-------------------------|---------------------|
| A. sclera | I. conjunctiva |
| B. retina | J. choroid |
| C. vitreous humor | K. pupil |
| D. iris | L. canal of Schlemm |
| E. aqueous humor | M. cornea |
| F. lens | N. optic disc |
| G. suspensory ligaments | O. uvea |
1. _____ Anterior extension of the sclera; avascular structure that allows light to enter the eye
 2. _____ Outermost layer or tunic of the posterior eyeball
 3. _____ Called the *window of the eye* because it is the first structure through which light enters the eye
 4. _____ Colored portion of the eye (e.g., brown eyes, blue eyes)
 5. _____ Middle tunic; has a rich supply of blood and nourishes the retina
 6. _____ The shape of this structure changes in response to contraction and relaxation of the ciliary muscles; it refracts light waves.
 7. _____ Venous sinus that drains aqueous humor
 8. _____ Contact lenses are placed on this surface.
 9. _____ Layer that extends anteriorly to form the ciliary body and the iris
 10. _____ Innermost tunic; nervous tissue that contains the photoreceptors
 11. _____ The fluid that helps maintain the shape of the anterior cavity
 12. _____ Layer that contains the rods and cones
 13. _____ Circular opening in the center of the iris
 14. _____ Blind spot
 15. _____ Fluid that is formed by the ciliary body and drains through the canal of Schlemm

16. _____ Ciliary muscles attach to these bands of connective tissue that pull on the lens.
17. _____ Mucous membrane that lines the inner surface of the eyelids and folds back to cover a part of the anterior surface of the eyeball
18. _____ Layer that includes the macula lutea and fovea centralis
19. _____ Gel-like substance that fills the posterior cavity
20. _____ Structure that secretes aqueous humor and gives rise to intrinsic eye muscles called the *ciliary muscles*
21. _____ Composed of muscles that determine the size of the pupil
22. _____ Layer that sends information along the optic nerve to the occipital lobe
23. _____ The word that includes the choroid, the ciliary muscle, and the iris
24. _____ Gel-like fluid that gently pushes the retina against the choroid
25. _____ Layer that contains melanocytes to diminish glare as light enters the posterior cavity

MATCHING**Muscles and Nerves of the Eye**

Directions: Match the following terms to the most appropriate definition by writing the correct letter in the space provided. Some terms may be used more than once. See text, pp. 242-245.

- | | |
|---------------------------------|----------------------|
| A. optic nerve | G. abducens nerve |
| B. ciliary muscle | H. orbicularis oculi |
| C. levator palpebrae superioris | I. trochlear nerve |
| D. occipital lobe | J. radial muscle |
| E. oculomotor nerve | K. iris |
| F. extrinsic eye muscles | L. facial nerve |
| | M. circular muscle |
1. _____ Contains the radial muscle and circular muscles
 2. _____ Nerve that carries information from the photoreceptors to the primary visual cortex
 3. _____ Cranial nerve (CN) II

4. _____ Sensory nerve for vision
5. _____ Muscle that raises the eyelid
6. _____ Location of the primary visual cortex
7. _____ Elevated intracranial pressure compresses this nerve to cause ptosis of the eyelid.
8. _____ Muscles that move the eyeball in its socket
9. _____ The meaning of 4 in LR₆SO₄
10. _____ The meaning of 6 in LR₆SO₄
11. _____ The structures indicated by LR and SO in LR₆SO₄
12. _____ Elevated intracranial pressure compresses this nerve to cause fixed and dilated pupils.
13. _____ Impaired nerve function that diminishes lacrimation and the ability to close the eye
14. _____ Muscle that contracts to cause a miotic effect
15. _____ Muscle that contracts to cause mydriasis
16. _____ Muscle that contracts and relaxes to change the shape of the lens
17. _____ Damage to this nerve indicates why Mr. Bell has the weakest blink.
18. _____ Muscle that closes the eye
19. _____ Contraction of this muscle widens the pupil.
20. _____ Contains the muscles that cause mydriasis and miosis
21. _____ Includes the superior, inferior, medial, and lateral rectus; also includes the superior and inferior oblique
22. _____ Nerve that controls all extrinsic eye muscles except the lateral rectus and superior oblique
23. _____ Muscles that allow you to look at the ceiling without moving your head
24. _____ Muscle that attaches to the suspensory ligaments
25. _____ Structure that involves the optic chiasma

26. _____ Severing of this nerve causes blindness
27. _____ Nerve that contains only *sensory fibers*

MATCHING

Disorders of the Eye

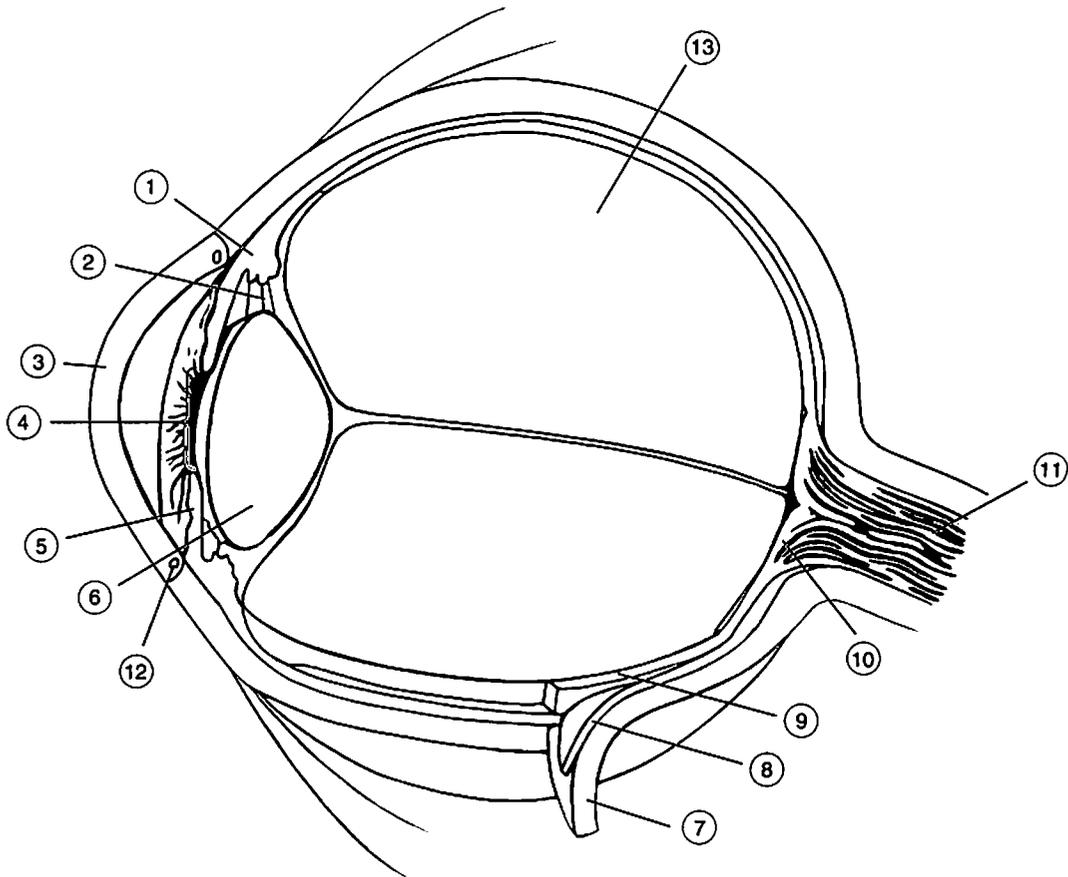
Directions: Match the following terms to the most appropriate definition by writing the correct letter in the space provided. Some terms may be used more than once. See text, pp. 238-248.

- | | |
|--------------------|-------------------|
| A. presbyopia | G. conjunctivitis |
| B. myopia | H. ptosis |
| C. glaucoma | I. hordeolum |
| D. detached retina | J. choked disc |
| E. night blindness | K. astigmatism |
| F. strabismus | L. cataracts |
1. _____ The eyelid is not completely raised, giving the person a sleepy appearance.
 2. _____ An infection; also called *pinkeye*
 3. _____ An error of refraction described by an older adult who says that his or her arms are getting shorter
 4. _____ Staphylococcal infection along the eyelid; also called a *sty*
 5. _____ Deficiency of vitamin A that affects the functioning of the rods and makes it difficult to see in dim light
 6. _____ Swelling of the optic disc (indication of increased intracranial pressure)
 7. _____ An error of refraction usually caused by a flattening or uneven curvature of the cornea
 8. _____ Nearsightedness
 9. _____ Crossed eyes
 10. _____ A disease characterized by increased intraocular pressure
 11. _____ Occurs when the nervous inner layer of the eye falls away from the choroid and is thereby deprived of an adequate blood supply
 12. _____ Clouding of the lens that impairs the transmission of light
 13. _____ Consequence of impaired drainage of aqueous humor

READ THE DIAGRAM

Eyeball

Directions: Referring to the diagram, fill in the spaces with the correct numbers. Some numbers may be used more than once. See text, pp. 239-243.



- | | |
|---|--|
| <p>1. _____ Anterior extension of the sclera; avascular structure that allows light to enter the eye</p> <p>2. _____ Outermost layer or tunic of the eyeball; composed of thick, fibrous connective tissue</p> <p>3. _____ Called the <i>window of the eye</i> because it is the first structure through which light enters the eye</p> <p>4. _____ Colored portion of the eye (e.g., brown eyes, blue eyes); composed of muscles that determine the size of the pupil</p> <p>5. _____ Middle tunic; has a rich supply of blood and nourishes the retina</p> <p>6. _____ The shape of this structure changes in response to the contraction and relaxation of the ciliary muscles; it refracts light waves.</p> | <p>7. _____ Venous sinus that drains aqueous humor</p> <p>8. _____ Contact lenses are placed on this surface.</p> <p>9. _____ Layer that extends anteriorly to form the ciliary body and the iris</p> <p>10. _____ Innermost tunic; the nervous tissue that contains the photoreceptors</p> <p>11. _____ Fluid that helps maintain the shape of the posterior cavity</p> <p>12. _____ Clouding of this structure causes cataracts.</p> <p>13. _____ The circular opening in the center of the iris</p> <p>14. _____ The blind spot</p> <p>15. _____ Gel-like substance that fills the posterior cavity</p> |
|---|--|

16. _____ Ciliary muscles attach to these bands of connective tissue that pull on the lens.
17. _____ Structure that secretes aqueous humor and gives rise to intrinsic eye muscles called *ciliary muscles*
18. _____ This layer includes the macula lutea and fovea centralis.
19. _____ Optic nerve
20. _____ Impaired drainage through this structure causes glaucoma.

COLORING

Directions: Color the appropriate areas on the illustration on the previous page as indicated below.

1. Color the space occupied by the aqueous humor *red*.
2. Color the space occupied by the vitreous humor *purple*.
3. Color the retina *yellow*.
4. Color the choroid, ciliary body, and iris *green*.
5. Color the sclera and cornea *blue*.
6. Color the lens *orange*.

ORDERING

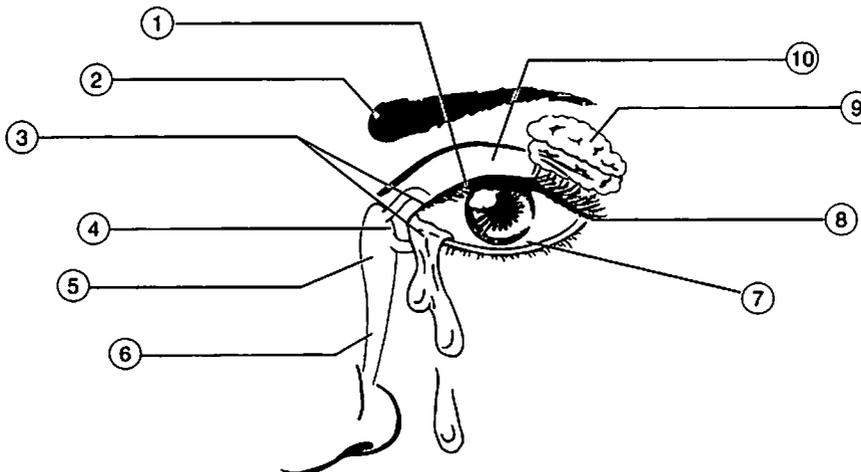
Directions: Place in order five structures listed below through which light must pass to activate the photoreceptors (rods and cones). Some structures listed below will NOT be used.

- Vitreous humor
- Ciliary muscle
- Sclera
- Cornea
- Optic nerve
- Aqueous humor
- Conjunctiva
- Lens
- Pupil

1. _____
2. _____
3. _____
4. _____
5. _____

READ THE DIAGRAM

Directions: Referring to the diagram, fill in the spaces with the correct numbers. Some numbers may be used more than once. See text, pp. 238-239.



1. _____ Meeting place (closer to the ears) of the eyelids
2. _____ Meeting place of the sclera and the cornea

3. _____ Structure lined with the conjunctiva
4. _____ Patch of hair that is located superior to the eye; traps dust and diminishes glare
5. _____ Secretes tears
6. _____ A gland located in the upper lateral quadrant of the orbit
7. _____ Tears leave the surface through these tiny holes.
8. _____ Pressure on CN III causes ptosis of this structure.
9. _____ Tears flow from the lacrimal puncta into this structure.
10. _____ Damage to the facial nerve causes decreased secretion of this gland.
11. _____ Structure that delivers tears to the nasal cavity
12. _____ Meeting place (closer to the nose) of the eyelids
13. _____ This structure is raised by the levator palpebrae superioris.
14. _____ The junction that is called the limbus

STORY

How to See

Directions: Complete the paragraph by writing the correct term in the space provided. See text, pp. 240-246.

cones	lens
occipital	retina
cornea	pupil
rods	optic
fovea centralis (macula lutea)	

Light waves pass through the _____, the avascular extension of the sclera. The light goes through the opening in the iris called the _____ and then through a refracting structure called the _____. In daylight, the light waves focus on the _____, the area of most acute vision because of the high numbers of _____, the photoreceptors for color vision. In dim light, the light waves are scattered along the periphery of the retina, stimulating the _____, the photoreceptors for night vision. Action potentials (nerve impulses) are

formed by the stimulated photoreceptors located in the inner layer of the eye, called the _____. The nerve impulses travel along the _____ nerve to the _____ lobe of the cerebrum.

MATCHING

Parts of the Ear

Directions: Match the following terms to the most appropriate definition by writing the correct letter in the space provided. Some terms may be used more than once. See text, pp. 248-251.

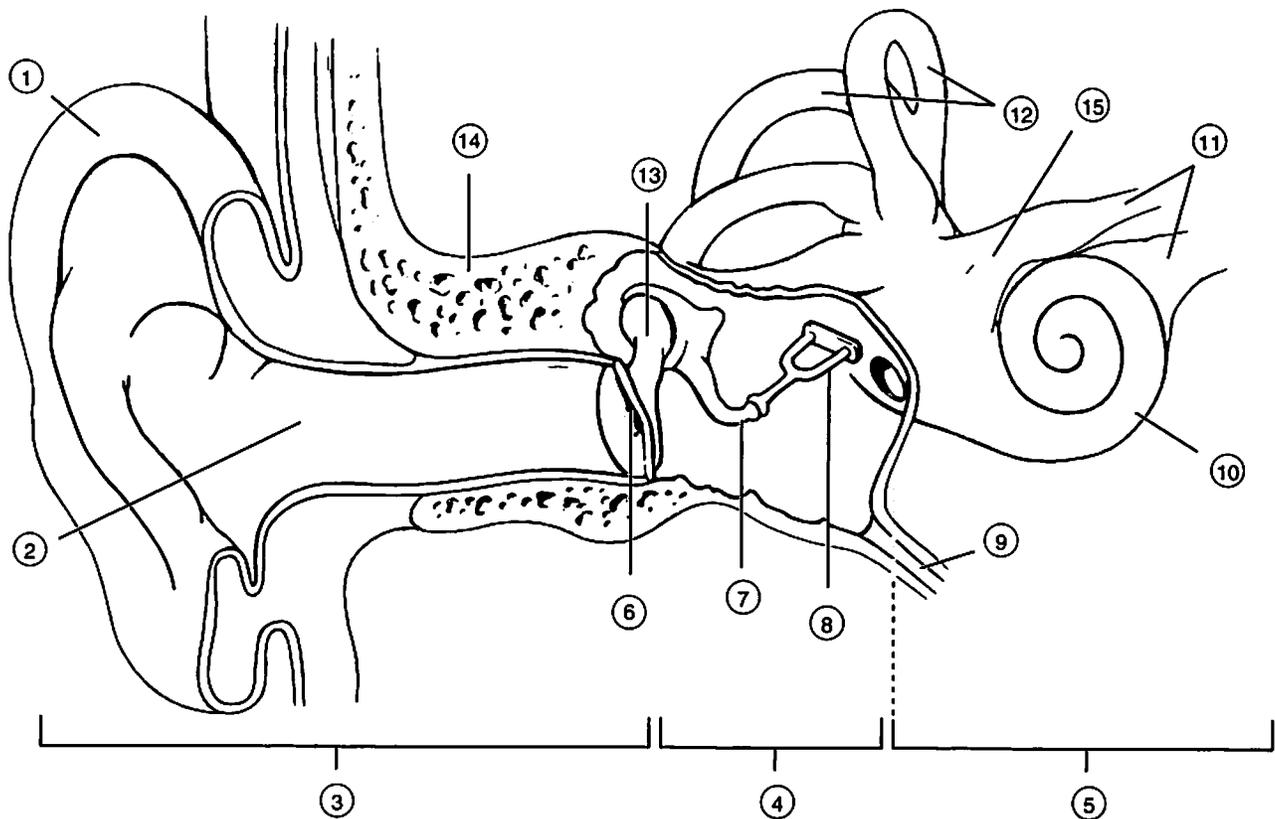
- | | |
|-----------------|--------------|
| A. external ear | C. inner ear |
| B. middle ear | |

1. _____ Location of the semicircular canals, cochlea, and vestibule
2. _____ Location of the hammer, anvil, and stirrup
3. _____ Ototoxicity (e.g., damage to CN VIII by antibiotics) occurs here.
4. _____ Location of the auditory canal and cerumen
5. _____ The eustachian tube connects the pharynx with this part of the ear.
6. _____ Location of the organ of Corti
7. _____ The tympanic membrane separates the middle ear from this part of the ear.
8. _____ CN VIII originates within this part of the ear.
9. _____ Otitis media occurs here.
10. _____ Location of the malleus, incus, and stapes
11. _____ Ménière's disease occurs here.
12. _____ Vibration of bone occurs here.
13. _____ Location of the labyrinth, perilymph, and endolymph
14. _____ Nerve conduction deafness occurs here.
15. _____ Bone conduction deafness occurs here.
16. _____ Location of the auricle, or pinna
17. _____ "Rock and roll" deafness occurs here.

READ THE DIAGRAM

Ear

Directions: Referring to the diagram, place the correct number in the space. Some numbers may be used more than once. See text, pp. 248-251.



- | | |
|---|--|
| 1. _____ Ossicle that sits in the oval window and transmits vibrations to the inner ear | 9. _____ Ossicle that is called the <i>stirrup</i> or <i>stapes</i> |
| 2. _____ Structure that connects the middle ear with the throat | 10. _____ Long tubelike structure that is part of the external ear |
| 3. _____ Semicircular canals that function in balance or equilibrium | 11. _____ Otitis media occurs here. |
| 4. _____ Vestibulocochlear nerve | 12. _____ "Glue ear" occurs here. |
| 5. _____ Snail-like structure in the inner ear that contains the organ of Corti | 13. _____ Bone that contains the external auditory meatus |
| 6. _____ Ossicle that picks up vibrations from the eardrum | 14. _____ Ossicle that is called the <i>malleus</i> or <i>hammer</i> |
| 7. _____ Structure that separates the external ear from the middle ear | 15. _____ Nerve conduction deafness affects this structure. |
| 8. _____ Ossicle located between the malleus and stapes | 16. _____ Hearing is impaired when cerumen is packed against this structure. |

COLORING

Directions: Color or draw the appropriate areas on the illustration on the previous page as indicated below.

1. Color the external ear *blue*.
2. Color the middle ear *red*.
3. Color the inner ear *yellow*.
4. Put an *X* on the malleus.
5. Put a *Y* on the incus.
6. Put a *Z* on the stapes.
7. Draw some germs crawling up the eustachian tube into the middle ear.
8. Draw a blob of cerumen leaning up against the tympanic membrane.
9. Place a tube through the tympanic membrane. (Congrats! You have just performed a tympanostomy.)

STORY**How to Hear**

Directions: Complete the paragraph by writing the correct term in the space provided. Some terms may be used more than once. See text, pp. 248-250.

endolymph	temporal
incus (anvil)	organ of Corti
cochlear	tympanic membrane
malleus (hammer)	stapes (stirrup)

Sound waves travel through the external auditory canal and bump into the _____, causing the "drum" to vibrate. The vibration is transmitted to the three tiny ossicles called the _____, _____, and _____. The _____ vibrates against the oval window, causing the fluid within the inner ear to move. The inner ear fluid, called the _____, bends the hairlike projections of the receptors, called the _____. When the hairs are bent, action potentials are fired; the nerve impulses travel along the _____ branch of the CN VIII to the _____ lobe of the cerebrum.

SIMILARS AND DISSIMILARS

Directions: Circle the word in each group that is least similar to the others. Indicate the similarity of the three words on the line below each question.

1. chemo- noci- photo- audio-

2. pain touch vision proprioception

3. hearing pressure pain temperature

4. taste smell hearing proprioception

5. balance proprioception sight taste

6. bitter salty hot sour

7. lacrimal glands lacrimal puncta gustatory tears

8. retina eyebrows eyelids palpebrae

9. sclera retina vitreous humor choroid

10. retina rods conjunctiva cones

11. refraction photoreceptors lens emmetropia

12. hyperopia refraction myopia glaucoma

13. vitreous humor	canal of Schlemm	ciliary body	aqueous humor	25. organ of Corti	eustachian tube	cochlea	CN VIII
14. mydriasis	pupil	iris	suspensory ligaments	26. rods	organ of Corti	photoreceptors	cones
15. retina	fovea centralis	sclera	macula lutea	27. balance	semicircular canals	middle ear ossicles	CN VIII
16. CN II	CN III	vagus	optic nerve	28. endolymph	cerumen	perilymph	inner ear
17. superior rectus	inferior oblique	radial	medial rectus	29. lens	retina	tympanic membrane	cornea
18. circular	radial	iris	refraction	30. glaucoma	cataracts	otitis media	macular degeneration
19. optic chiasm	refraction	CN II	optic tract	31. ototoxicity	Ménière's disease	glaucoma	otitis media
20. astigmatism	myopia	cataracts	farsighted	32. fovea centralis	macula lutea	ptosis of the eyelid	cones
21. external	middle	inner	temporal lobe	33. pain	nociceptor	pyramidal	spinothalamic
22. malleus	eustachian tube	incus	stapes	34. meibomian gland	tarsal gland	blind spot	eyelid
23. hammer	anvil	stirrup	tympanic membrane				
24. cochlea	eustachian tube	semicircular canal	vestibule				

Part II: Putting It All Together

MULTIPLE CHOICE

Directions: Choose the correct answer.

1. Which of the following is most related to phantom limb pain?
 - a. photoreceptor
 - b. adaptation
 - c. projection
 - d. accommodation
2. Which of the following receptors adapt most rapidly?
 - a. receptors that detect blood chemistries
 - b. olfactory receptors
 - c. pain receptors
 - d. nociceptors
3. Which of the following is most related to the spinothalamic tract, thalamus, and nociceptors?
 - a. temperature
 - b. speech
 - c. pain
 - d. sight
4. Which of the following is a true statement?
 - a. CN I carries information from the retina to the occipital lobe.
 - b. The olfactory nerve is motor.
 - c. The receptors for the gustatory sense are located on the tongue.
 - d. The receptors for gustation are mechanoreceptors.
5. Which of the following is true about tears?
 - a. prevent corneal ulceration
 - b. form the vitreous humor
 - c. form aqueous humor
 - d. drain through the canal of Schlemm
6. Which of the following describes the basis for referred pain (e.g., the pain of a heart attack radiates to the left shoulder and arm)?
 - a. Myocardial enzymes from the injured heart muscle diffuse into the shoulder region.
 - b. The same blood vessels that supply the myocardium also supply the shoulder and arm.
 - c. The same nerves that carry sensory information from the heart also carry sensory information from the shoulder.
 - d. Nociceptors are found only in the axillary region.
7. Refraction is accomplished when
 - a. the pupils constrict.
 - b. a sensation is projected back to the receptor.
 - c. mydriasis occurs.
 - d. light waves are bent.
8. All the extrinsic eye muscles
 - a. determine pupillary size.
 - b. move the eyeball in the socket.
 - c. refract light waves.
 - d. change the shape of the lens.
9. Which of the following is not true of the retina?
 - a. dependent on the choroid for oxygenation and nourishment
 - b. contains the photoreceptors
 - c. is the nervous layer of the eye
 - d. covers the optic disc, making it the area of most acute vision
10. Myopia, astigmatism, and hyperopia are all
 - a. treated by surgically removing the lens.
 - b. conditions of farsightedness.
 - c. causes of blindness.
 - d. errors of refraction.
11. The malleus, incus, and stapes
 - a. are inner ear structures.
 - b. are located within the semicircular canals.
 - c. contain the organ of Corti.
 - d. are ossicles located in the middle ear.
12. What happens at the optic chiasm?
 - a. Aqueous humor is secreted.
 - b. Rods and cones are stimulated.
 - c. Vitreous humor is drained from the posterior cavity.
 - d. Fibers of the optic nerve of each eye cross and project to the opposite side of the brain.
13. When drainage of the canal of Schlemm is impaired,
 - a. lacrimation ceases.
 - b. intraocular pressure increases.
 - c. the person develops presbyopia.
 - d. a cataract forms in the affected eye.
14. Which of the following is most associated with the rods?
 - a. color vision
 - b. macula lutea
 - c. fovea centralis
 - d. night vision

15. Which of the following is most related to the sense of hearing?
- organ of Corti
 - chemoreceptors
 - cranial nerve VII
 - occipital lobe
16. What is the result of contraction of the radial muscles of the eye?
- the eyeball looks toward the sky
 - the eyeball looks toward the nose
 - mydriasis
 - the eyelid opens
17. Which of the following is least related to the middle ear?
- bone conduction
 - eustachian tube
 - malleus, incus, and stapes
 - cochlea
18. What causes ototoxicity?
- clouding of the lens
 - paralysis of the ciliary muscles
 - damage to the cochlear nerve
 - collection of cerumen in the external ear
19. Which of the following refers to the reflex ability of the lens to change its shape as an object moves closer to the eye?
- accommodation
 - adaptation
 - projection
 - presbyopia
20. Because the pituitary gland is located behind the optic chiasm, a pituitary tumor is most likely to cause which condition?
- cataracts
 - a disturbance in vision
 - error of refraction, such as myopia
 - conjunctivitis
21. Which of the following is least descriptive of the organ of Corti?
- mechanoreceptors
 - eustachian tube
 - cochlea
 - inner ear
22. Which of the following is a balance-related inner ear structure?
- semicircular canal
 - organ of Corti
 - eustachian tube
 - cochlear nerve
23. The primary auditory cortex
- receives sensory input from CN II.
 - is located in the temporal lobe.
 - is called Wernicke's area.
 - initiates the nerve impulses that move the eyeball.
24. The eustachian tube connects the
- throat with the pharynx.
 - pharynx with the middle ear.
 - organ of Corti with CN VIII.
 - stapes with the eustachian tube.
25. What term is used to describe the choroid, ciliary muscle, and iris?
- meibomian
 - uvea
 - canthus
 - lacrimal apparatus
26. These glands secrete an oily substance that coats the outer surface of the anterior eyeball and reduces the evaporation of tears.
- lacrimal glands
 - ciliary body
 - meibomian glands
 - cerumen-secreting glands

CASE STUDY

Six-month-old I.R. awoke at 3 AM crying and pulling on her left ear. There was dried, green, purulent drainage on her earlobe and on the sheet of her crib. Her temperature was 38.3°C (101°F). The pediatrician prescribed an antibiotic and an analgesic.

- What is the most likely cause of her symptoms?
 - Ménière's disease
 - wax in her outer ear that was putting pressure on the eardrum
 - presbycusis
 - otitis media (middle ear infection)
- What is the cause of the purulent drainage?
 - inner ear fluid
 - endolymph mixed with earwax
 - pus that formed within the middle ear as part of the infectious process
 - cerumen
- What is indicated by the presence of purulent drainage on her earlobe?
 - The infection had run its course and was subsiding.
 - No antibiotic was necessary.
 - The tympanic membrane had ruptured.
 - Fluid from the inner ear was leaking into the external auditory canal.

Student Name _____

Part III: Challenge Yourself!**GROUPS AND PUZZLE**

1. Which group is incorrect?
 - a. tunics: sclera, choroid, retina
 - b. general senses: pain, temperature, touch, pressure, proprioception
 - c. special senses: hearing, sight, smell, taste, balance
 - d. structures of the inner ear: semicircular canals, vestibule, tympanic membrane
2. Which group is incorrect?
 - a. special senses: hearing, sight, smell, taste, balance
 - b. errors of refraction: myopia, astigmatism, glaucoma
 - c. structures of the inner ear: semicircular canals, vestibule, cochlea
 - d. ossicles: malleus, incus, stapes
3. Which group is incorrect?
 - a. tunics: sclera, choroid, retina
 - b. general senses: pain, temperature, touch, pressure, balance
 - c. structures of the inner ear: semicircular canals, vestibule, cochlea
 - d. ossicles: malleus, incus, stapes

PUZZLE**Hint: Visually, What's Up with Bella Donna?**

Directions: Perform the following functions on the Sequence of Words that follows. When all the functions have been performed, you are left with a word or words related to the hint. Record your answer in the space provided.

Functions: Remove the following:

1. Layers (three) of the eyeball
2. Photoreceptors (two)
3. Humors (two)

4. Refracting structure
5. Intrinsic eye muscles (three)
6. Nerve that stimulates most of the extrinsic eye muscles
7. Area of the retina that contains a large number of cones (two)
8. Light penetrates the iris through this hole
9. Part of the eye that contains the radial and circular muscles
10. Drainage point of aqueous humor

Sequence of Words

OCULOMOTORFOVEACENTRALISR
 ETINALENSILIARYCONESPUPILL
 ARYDILATIONAQUEOUSHUMORPU
 PILCIRCULARMACULALUTEAIRIS
 MYDRIASISCHOROIDRADIALVITRE
 OUSHUMORSCLERACANALOFSCHE
 LEMMRODS

Answer: _____, _____

BODY TOON**Hint: Where the Tears Are!****Answer: lacrimal duct (lacrimal duct)**