These review questions are for the Senses lecture topic. The questions were adapted from several sources, including 1700+ Review Questions for Anatomy and Physiology II (3rd edition) by R. Michael Anson, Ph.D.

You are required to know and understand all the material on the senses that is covered in the lecture and the laboratory. Questions marked with an asterisk are from material presented in the laboratory section of the course.

Multiple choice review questions:

1) The term _____ means cells that detect sense stimuli (such as light, sound, touch, etc.) and transducer the stimuli into a nerve signal.
A) Sensory generator
B) Sense cells
C) Sense receptor
D) Nerve sensors

2) All sense receptors contain a _____ (a cell type).
A) Epithelial cell
B) Smooth muscle cell
C) Sensory neuron
D) Skeletal muscle cell

3) The _____ are the sensory receptors in the skin.
A) Epithelial receptors
B) Neuron receptors
C) Cutaneous receptors
D) Sensory dermis

4) The receptors that produce pain are called
A) chemoreceptors
B) mechanoreceptors
C) proprioceptors
D) nociceptors

5) Receptors in the muscles, tendons, and joints that inform the brain of the position and movements of the body parts, are known as
A) nocioceptors.
B) cutaneous receptors.
C) proprioceptors.
D) exteroreceptors.

6) The cutaneous senses would include all of the following except
A) pressure.
B) temperature
C) light
D) pain

7) The posterior cavity of the eye (the large cavity between the lens and the retina) is filled with
A) aqueous humor.
B) vitreous humor.
C) endolymph.
D) perilymph.

8) The outer muscles on the eye are called the _____ muscles. They are skeletal muscles that control voluntary eye movements such as looking left, looking right, etc.
A) Extrinsic
B) Ciliary
C) Ocular
D) External

9) The wall of the eye has three layers called _____.
A) Tunics
B) Tissues
C) Vision lamella
D) Ocular epithelium

10) Which is **not** one of the three tunics?
A) Sclera
B) Retina
C) Ciliary body
D) Choroid coat

11) Light enters the interior of the eye through a small hole called the _____.
A) Cornea
B) Iris
C) Lens
D) Pupil

12) The colorful part of the eye (the part that can be brown, blue, gray, or green) is called the _____.
A) Cornea
B) Iris
C) Lens
D) Pupil

13) In innermost tunic contains the sensory neurons that transduce light into nerve signals. This tunic is called the _____.

A) Optic sclera
B) Optic nerve
C) Retina
D) Endoneurium

14) The cells of the retina that absorb and detect light are the _____ cells.

A) mechanoreceptor
B) thermoreceptor
C) nocioceptor
D) photoreceptor

15) The retina has three layers of nervous tissue. Which is the correct order of the retina's layers, from anterior to posterior?

A) Ganglion cells, Bipolar cells, Photoreceptors
B) Photoreceptors, Ganglion cells, Bipolar cells
C) Bipolar cells, Ganglion cells, Photoreceptors
D) Bipolar cells, Photoreceptors, Ganglion cells

16) Within the retina

A) the photoreceptors synapse directly with the bipolar cells.
B) the bipolar cells stimulate the photoreceptors.
C) the ganglion cells are directly coupled to the photoreceptors.
D) bipolar cell axons form the optic nerve

17) The optic nerve is composed of axons extending from the ____ cells in the retina.

A) ganglion
B) bipolar
C) cone
D) photoreceptor (rods and cones)

18) The area of the eye where the optic nerve passes through the retina is called the _____.

A) Sclera fenestra
B) Nerve foramen
C) Blind spot
D) Pupil

19) The photoreceptors known as cones allow for

A) vision at normal daylight intensities.
B) sharply detailed vision.
C) color vision.
D) a high degree of light sensitivity.

20) Which is **not** one of the cone types?
A) Yellow
B) Blue
C) Green
D) Red

21) When light is absorbed by photoreceptor cells, which of the following events does **not** occur?
A) Visual pigment changes shape
B) The photoreceptor cells become depolarized.
C) The photoreceptor cells release neurotransmitter
D) The ciliary body muscles conduct the signal.

22) The change in visual pigment molecules when stuck by light is called
A) transudction
B) polarization
C) depolarization
D) bleaching

23) Which phrase best describes the arrangement of rods and cones in the retina?
A) Cones mostly at the sides, rods mostly in the anterior region
B) Cones and rods evenly found throughout the retina
C) Cones mostly in the posterior region, rods mostly at the sides
D) Cones spread evenly throughout the retina but rods mostly at the posterior

24) The cones-only area in the center of the retina is called the _____. This is the area of greatest color vision.
A) optic nerve.
B) ganglion cells.
C) fovea centralis.
D) optic disc.

25) The function of the lens of the eye is to
A) serve as the major site of focusing of light rays.
B) control the size of the pupil.
C) control the amount of light entering the eye.
D) All of these are functions of the lens.

26) To keep an object in focus when the object is near the eye, the ciliary body muscles change the shape of the lens. This process is called _____.
A) myopia.
B) hyperopia.
C) adaptation.
D) accommodation.

27) When a far object is sharply focused on the retina the
A) lens is rotated by the iris
B) lens is rotated by the sclera
C) ciliary muscle is relaxed.
D) the retina is relaxed

28) The visual disorder where far objects can be focused but near objects can't is sometimes called "far sighted", but the correct term for the condition is _____.
A) myopia.
B) hyperopia.
C) astigmatism.
D) cataracts.

29) The visual disorder where near objects can be focused but far objects can't is sometimes called "near sighted", but the correct term for the condition is _____.
A) myopia.
B) hyperopia.
C) astigmatism.
D) cataracts.

30) Which structures are found in the outer ear? Select all correct answers.
A) Tympanic membrane
B) Auricle
C) Ossicles
D) Endolymph
E) Cochlea
F) Semicircular canals
G) Vestibule
H) Auditory canal

31) Which structures are found in the middle ear? Select all correct answers.
A) Tympanic membrane
B) Auricle
C) Ossicles
D) Endolymph
E) Cochlea
F) Semicircular canals
G) Vestibule
H) Auditory canal

32) Which structures are found in the inner ear? Select all correct answers.

A) Tympanic membrane
B) Auricle
C) Ossicles
D) Endolymph
E) Cochlea
F) Semicircular canals
G) Vestibule
H) Auditory canal

33) The middle ear

A) contains the cochlea and semicircular canals.
B) is responsible for transmitting sound waves from the outer ear to the inner ear.
C) contains the otolith organs.
D) has abundant hair cells.

34) Hair cells send a nerve signal when

A) they are exposed to endolymph
B) they bind molecules
C) their cilia bend
D) Another neuron stimulates them

35) Hair cells are the sense receptors in all of the following sense organs except

A) the semicircular canals.
B) the cochlea.
C) the skin.
D) the otolith organs

36) The area of the inner ear that detects sounds (where sounds are transduced into nerve signals) is the

A) Cochlea
B) Vestibule
C) Semicircular canals
D) Endolymph

37) The _____ is the structure within the cochlea that contains hair cells sandwiched between two membranes.

A) Organ of Corti
B) Eustation tube
C) Utricle
D) Ossicle

38) The sensory hair cells of the organ of Corti rest on the
A) basilar membrane.
B) vestibular membrane.
C) tectorial membrane.
D) tympanic membrane.

39) The brain can distinguish low pitched sounds from high pitched sounds because low pitched sounds
A) cause a higher amplitude of vibration of throughout the organ of Corti.
B) vibrate the tectorial membrane of the organ of Corti more than the basilar membrane.
C) vibrate the basilar membrane of the organ of Corti more than the tectorial membrane.
D) stimulate the deeper organ of Corti more than the outer organ of Corti

40) In addition to housing our hearing sense, the inner ear also houses our _____ sense.
A) Vibration
B) Danger/Crisis
C) Equilibrium
D) Telekinetic

41) The equilibrium sense allows us to detect
A) Homeostasis of internal nutrient concentrations
B) Changes in our general well being
C) Equal amounts of positive and negative ions in body fluids
D) Movement

42) Which parts of the inner ear are involved in the equilibrium sense? (Choose all correct answers)
A) Cochlea
B) Vestibule
C) Semicircular canals
D) Ossicles

43) Straight line motion is detected by structures in the _____, whereas rotational motion is detected by structures in the _____.
A) Vestibule, Cochlea
B) Semicircular canals, Vestibule
C) Vestibule, Semicircular canals
D) Semicircular canals (for both types of movement)

44) Linear movement of the body is detected primarily by structures in the vestibule known as _____.
A) otolith organs
B) kinetochores
C) endolymphs
D) ossicles

45) Which of the following are otolith organs? Choose all correct answers.
A) Saccule
B) Ampulla
C) Cupula
D) Utricle

46) The hair cells in a semicircular canal are located in a gel called the _____.
A) ampulla.
B) cupula.
C) otolith membrane.
D) tectorial membrane.

47) The cupula in a semicircular canal is located in a wide region at the end of the canal called the _____.
A) ampulla.
B) cupula.
C) utricle.
D) saccule.

48*) The sensation that the room is spinning when one feels dizzy is due to
A) after-discharge of the sensory neurons.
B) continued movement of the semicircular canals.
C) movement of the endolymph fluid.
D) movements of the otolith membrane.

49) The correct term for the sense of smell is the _____ sense.
A) Fragrance
B) Olfactory
C) Huelaratory
D) Aromatic

50) Olfactory receptors are located in the…
A) Bladder and kidneys
B) Alimentary canal
C) Oral cavity
D) Nasal epithelium

51) The senses of smell and taste have all of the following in common except
A) both sense five different types of molecules
B) both use chemoreceptors
C) the brain have specialized sense areas to receive their signals
D) both transmit nerve signals directly to the brain (not via the spine)

52) How many different types of molecules can be detected by the olfactory (smell) sense?

A) 5
B) 25
C) 350
D) 10,200

55) How many different types of molecules can be detected by the gustatory (taste) sense? (In other words, how many different types of taste receptors do we have?).

A) 5
B) 25
C) 350
D) 10,200

54) Which of the following is not a taste receptor type?

A) salty
B) fatty
C) bitter
D) sweet

55) H^+ ions (acids) cause which taste sensation?

A) sour
B) sweet
C) salty
D) bitter

56) The chemoreceptors on the tongue that are most sensitive to and respond to many types of plant toxins are the taste receptors for

A) sweet.
B) salty.
C) bitter.
D) sour.

Answers to multiple choice questions:

1 = C
2 = C
3 = C
4 = D
5 = C
6 = C
7 = B
8 = A
9 = A
10 = C
11 = D
12 = B
13 = C
14 = D
15 = A
16 = A
17 = A
18 = C
19 = C
20 = A
21 = D
22 = D
23 = C
24 = C
25 = A
26 = D
27 = C
28 = B
29 = A
30 = B and H
31 = A and C
32 = D, E, F, and G
33 = B
34 = C
35 = C
36 = A
37 = A
38 = A
39 = D
40 = C
41 = D
42 = B and C
43 = C
44 = A
45 = A and D
46 = B
47 = A
48 = C
49 = B
50 = D
51 = A
52 = C
53 = A
54 = B
55 = A
56 = C

Fill-in-the-blank review questions:

1) In order for an event to be sensed, an appropriate sensory receptor must convert the stimulus to a(n) _____.

2) The function of sensory receptors is to _____ (a word meaning “change”) sense stimuli such as light, sound, taste, etc. into a nerve signal.

3) _____ are receptors that are dedicated to sensing pain.

4) Receptors in the skin that respond to pressure (touch), temperature, and tissue damage are called _____.

5) _____ are receptors which are found in skeletal muscles, tendons, joints, ligaments, etc., which allow us to sense the position of the body.

6) Each eye has how many extrinsic (external) muscles to move the eyeball? _____

7) The eye has wall composed of three layers, or "_____."

8) The outermost tunic of the eyeball has two regions: In the front, it is clear, forming the _____. The other areas are white, and form the _____.

9) The middle tunic of the eye is called the _____

10) The _____ is the innermost tunic of the three eye wall tunics.

11) In the front of the eye, the _____ is the pigmented area surrounding the pupil. Its purpose is to _____.

12*) A defect (a non-smooth area) in the lens or the cornea that causes one part of the field of vision to be blurry is called a(n) _____.

13) In dimly lit areas, the pupil will dilate/contract (circle one).

14) The posterior chamber of the eye (the hollow space between the lens and the retina) is filled with a fluid called _____.

15) The anterior cavity of the eye (between the lens and the cornea) is filled with _____, a clear fluid similar to blood plasma.

16)The _____ is the clear part of the eye that focuses light images on the retina. Many patients benefit from having it re-shaped surgically to correct myopia, hyperopia, or astigmatism.

17) _____ are neurons that sense light energy; in humans, these are found in the retina.
18) The _____ are the photoreceptors that provide color vision and the _____ are the photoreceptors that provide black-and-white vision.

19) What are the two major types of photoreceptors called? _____ and _____.

20) What are the three types of color-sensing photoreceptors (what colors)? ____, ____, and ____.

21) The retina has three sub-layers. The cells of the three layers (from anterior-most to posterior-most) are called _____, _____, and _____.

22) In order to be absorbed by photoreceptors, light must actually pass through the _____ layer and the ____ layer of the retina.

23) The axons of the retinal ganglion cells run along the surface of the retina then they become bundled together, pass through the back of the eye, and connect to the brain. This bundle of axons is called the _____.

24) The region of the retina where the axons of the retinal ganglion cells leave the eye is called

the _____ or _____, and lacks _____.
25) Color blindness is due to the genetic absence of one type of _____.

26) Color blindness is more common in which sex? _____

27) The retina generates a nerve signal when it is struck by light. Use the numbers 1 – 5 to indicate in what order the nerve signal passes through the following structures:

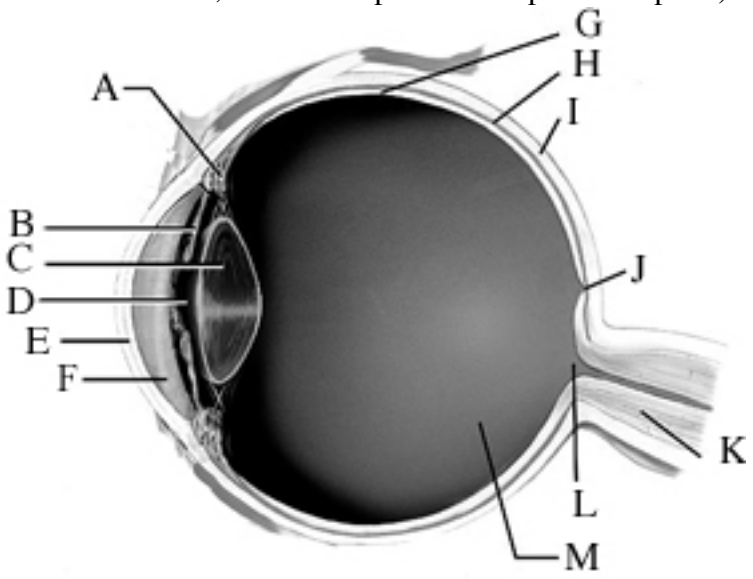
Optic nerve: ____
Ganglion cell: ____
Visual area of cerebrum: ___
Photoreceptor cell: ____
Bipolar cell: ____

28) When a visual pigment molecule in a photoreceptor cell is hit by light, it _____, and this results in the photoreceptor cell generating a _____.

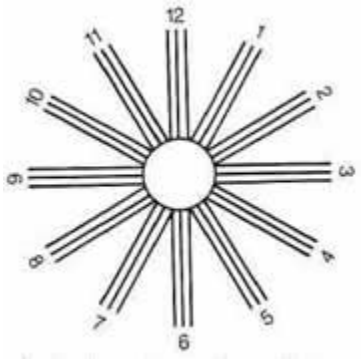
29) The point on the retina directly behind the lens (therefore in the center of your vision) is called the _____. It has only one type of photoreceptor cell. Which type? _____.

30*) 20/15 vision is better/worse (circle one) than 20/20 vision.

31) In the diagram below, name eye parts A – M. (Some hints: M and F are fluids, J is a small spot with that gives the greatest color vision, and L is a spot with no photoreceptors).



32*) In lab, the chart below was used to test for what eye disorder?



33) The number of cones increases/decreases (circle one) toward the posterior of the retina.

34) _____ is the ability of eye to focus on near objects.

35) Accommodation occurs when the _____ bends the _____ into a different shape.

36) In a relaxed eye, the lens focuses far/near (circle one) objects on the retina.

37) Contracting the ciliary body of an eye results in focusing far/near (circle one) objects on the retina.

38) _____ is nearsightedness: All focal points are anterior/posterior (circle one) compared to where they normally are found.

39) _____ is farsightedness: all focal points are anterior/posterior (circle one) compared to where they normally are found.

40) Which disorder (hyperopia or myopia) is the one where the person can see far objects but not near objects? _____

41) The vision problem _____ occurs when the focal point of the lens is longer than the distance to the retina.

42) If a person with myopia is looking at a near object and their ciliary body is relaxed, the focal point of the object will fall in front of/on/behind (circle one of the three) the retina.

43) If a person with myopia is looking at a near object and their ciliary body is contracted, the focal point of the object will fall in front of/on/behind (circle one of the three) the retina.

44) If a person with myopia is looking at a far object and their ciliary body is relaxed, the focal point of the object will fall in front of/on/behind (circle one of the three) the retina.

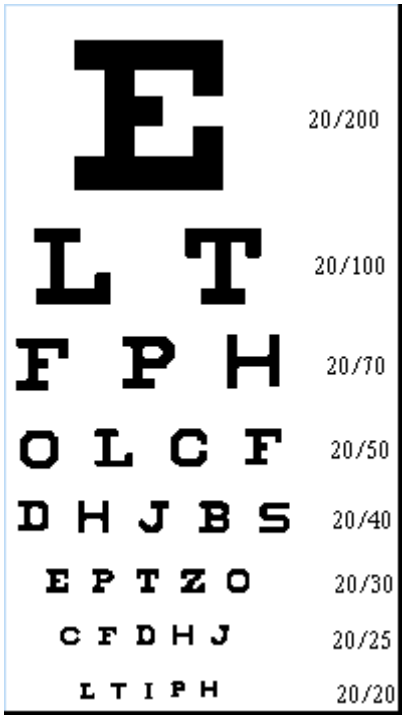
45) If a person with hyperopia is looking at a far object and their ciliary body is contracted, the focal point of the object will fall in front of/on/behind (circle one of the three) the retina.

46) If a person with hyperopia is looking at a far object and their ciliary body is relaxed, the focal point of the object will fall in front of/on/behind (circle one of the three) the retina.

47*) Name the test you performed in lab to measure how close an object could be and still be focused.

48*) Explain briefly how you performed the near point of accommodation test.

49*) Name the vision test that the chart below was used for in lab.



50*) _____ is a problem in which the cornea or lens is unevenly shaped, so that some objects appear blurry but others are in focus.

51) The outer ear is composed of the visible portion of the ear, known as the _____, and the tube leading inward, known as the _____.

52) The _____ is the outermost structure of the middle ear.

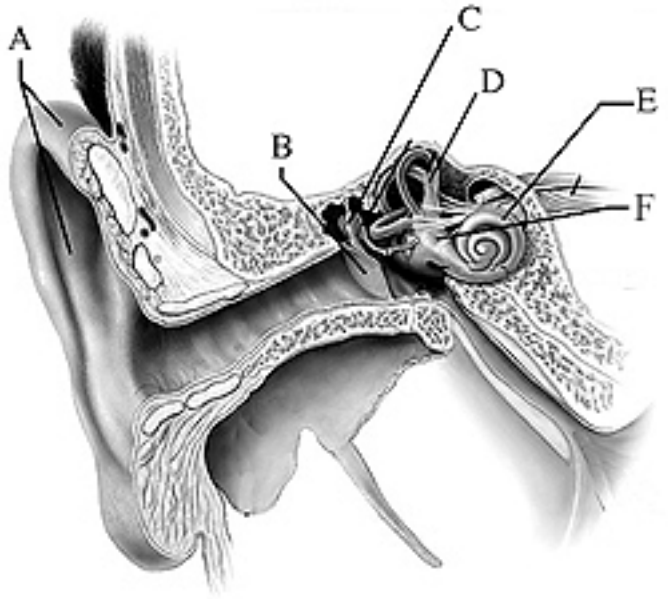
53) The three small bones of the middle ear are called the _____ (Hint: One word for all three bones)

54*) The two test hearing tests for deafness you performed in lab were the _____ test and the _____ test.

55) The inner ear contains fluids. The most abundant of the fluidsis called _____.

56) The correct anatomical term for the eardrum is the _____.

57) In the diagram below, identify ear structures A – F. (Hint: C is a term for all the bones in the middle ear).



58) As vibrations in the air cause the eardrum to vibrate, the eardrum pushes against the First of the three _____ bones.

59) Which part of the inner ear do vibrations first arrive at?

60) When vibrations arrive at the vestibule, they are converted to vibrations of the _____ fluid in the inner ear .

61) The cochlea is a snail shaped organ in the inner ear which is responsible for _____.

62) The actual organ within the cochlea which is responsible for hearing is the _____. (Hint: It is made of hair cells sandwiched between two membranes).

63) Movement of fluid in the inner ear causes movement of the _____ membrane, which results in movement cilia of the _____, which are the sensory receptors located in the cochlea.

64) The _____ membrane is an inflexible membrane that attaches to the cilia of hair cells within the cochlea.

65) Sounds of high pitch are detected by hair cells at the start/end (circle one) of the cochlea, whereas sounds of low pitch are detected by hair cells at the start/end (circle one) of the cochlea.

66*) Name the test in lab where the subject closed their eyes and then had to point to the source of a sound.

67*) _____ is a type of deafness caused by impairment of sound before reaching the inner ear. Usually the problem is caused by damage to the middle ear structures.

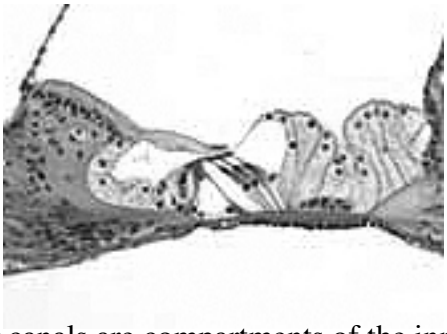
68*) _____ is a type of deafness caused by damage to the neural structures of the inner ear, usually the cochlear hair cells.

69*) If the joints of the middle ear bones became inflamed, the result would be _____ deafness.

70*) Death of some hair cells in the Organ of Corti is common in old age, leading to _____ deafness.

71) The vestibule is a compartment of the inner ear which is the major region involved in the sense of _____.

72*) In the hearing lab, you viewed a microscope slide like the one shown below. What part of the ear is it?



73) The semicircular canals are compartments of the inner ear which sense _____.

74) The _____ organs are structures in the vestibule which sense linear (up, down, left, right, forward, backward, etc.) movement.

75) There are two otolith organs in the vestibule: the _____ and the _____.

76) The otolith organs contain hair cells whose cilia are imbedded in a _____ that also contains _____, which are dense granules of calcium.

77) The otolith organs provide a sense of_____ movement; while the semicircular canals provide a sense of _____ movement.

78) The otoliths are composed of microscopic crystals of _____

79) The sensory hair cells of the semicircular canals are located within a wide region of the canals called the _____.

80) Using the letters from question 57 as answers, which part of the ear…

a) Contains the organ of Corti? ____
b) Is where spinning motion is detected? ____
c) Are the smallest bones in the body? ____
d) Contains a structure called the ampulla? ____
e) Contains structures called the utricle and saccule? ____
f) Contains otoliths? ____
g) Is where moving forward is detected? ____
h) Contains hair cells that are used in sensing? ____

81) The enlarged regions at the entrance to each semicircular canal are the _____, each of which houses a jelly-like structure called a(n) _____. There are hair cells within this structure.

82) When we rotate, the _____ (a fluid) in the semicircular canals begins to flow. The moving fluid bends the _____, which bends the _____ of the hair cells' cilia, which causes the hair cells to _____.

83) _____ are sensory neurons that detect molecules (chemicals) for the senses of smell and taste.
.
84) Taste buds are located on ridges of the tongue called papilla. The taste buds are located on the _____ of the papilla (Hint: Possible answers are: top, bottom, or sides).

85) _____ is the correct term for the sense of smell.

86) The five kinds of taste receptors are____, ____, ____, ____, and ____.

87) If you drank NaOH (the active chemical in Draino and oven cleaner…not a good idea), which of the taste sensations would you experience? Give all answers. (Hint: NaOH turns into Na^+ and OH^- in your saliva. Review the OH^- ion in the chapter on water chemistry).

88) If you drank HCl (a strong acid…not a good idea), which of the taste sensations would you experience? _____

89) Taste receptors in the tongue are located in clusters called _____.

90*) The olfactory receptors are located in which part of the nasal cavity? _____.

91) There are only five kinds of taste receptors, but there are _____ (roughly how many?) different types of olfactory receptors.

Answers to fill-in-the-blank review questions:

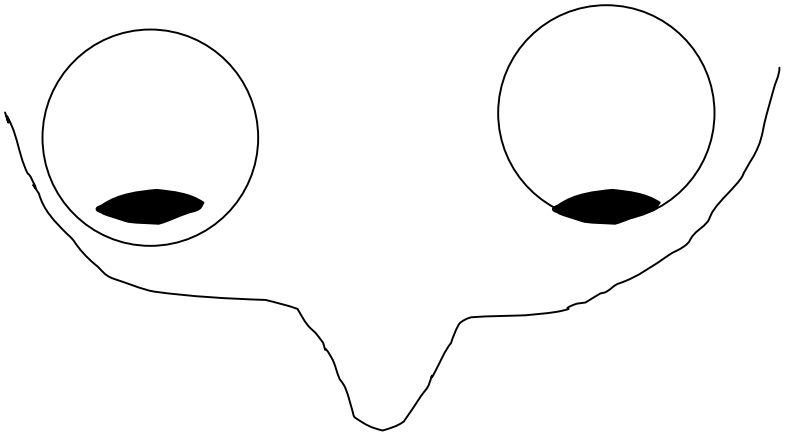
1) Nerve signal
2) Transduce
3) Nociceptors
4) Cutaneous receptors
5) Proprioreceptors
6) Six
7) Tunics
8) Cornea
   Sclera
9) Choroid
10) Retina
11) Iris
   Control the pupil size
12*) Astigmatism
13) Dilate
14) Vitreous humor
15) Aqueous humor
16) Lens
17) Photoreceptors
18) Cones
   Rods
19) Cones
   Rods
20) Red
   Blue
   Green
21) Ganglion cells
   Bipolar cells
   Photoreceptor cells
22) Ganglion cells
   Bipolar cells
23) Optic nerve
24) Blind spot
   Optic disc
   Photoreceptor cells/vision
25) Cone types
26) Males
27) 4
   3
   5
   1
   2
28) Bleaches/changes shape
   Nerve signal
29) Fovea centralis
   Cones only
30*) Better
31) a = Ciliary body
   b = Iris
   c = Lens
   d = Pupil
   e = Cornea
   f = Aqueous humor
   g = Retina
   h = Choroid
   i = Sclera
   j = Fovea centralis
   k = optic nerve
   l = Blind spot/optic disc
   m = Vitreous humor
32*) Astigmatism
33) Increases
34) Accommodation
35) Cilary body
   Lens
36) Far
37) Near
38) Myopia
   Anterior
39) Hyperopia
   Posterior
40) Hyperopia
41) Hyperopia
42) On
43) In front of
44) In front of
45) On
46) Behind
47*) Near point of accommodation
48*) Place a ruler near the eye, then slide an object toward the eye. Read the closest distance that the object is still in focus.
49) Visual acuity test
50*) Astigmatism
51) Auricle
   Auditory canal
52) Tympanic membrane

53) Ossicles
54*) Rinne
Weber
55) Endolymph
56) Tympanic membrane
57) A = Auricle
B = Tympanic membrane
C = Ossicles
D = Semicircular canals
F = Cochlea
G = Vestibule
58) Ossicle
59) Vestibule
60) Endolymph
61) The sense of hearing
62) Organ of Corti
63) Basilar
Hair cells
64) Tectorial
65) Start
End
66*) Sound localization test
67*) Conduction
68*) Sensory
69*) Conduction
70*) Sensory
71) Equilibrium
72*) Cochlea (or Organ of Corti)
73) Rotational movement
74) Otolith
75) Utricle
Saccule
76) Gel
Otoliths
77) Linear
Rotational
78) Calcium
79) Ampulla
80) a) = E
b) = D
c) = C
d) = D or F
e) = F
f) = F
g) = F
h) = D, E, and F
81) Ampulla
Cupula
82) Endolymph
Cupula
Cilia
Generate a nerve signal
83) Chemoreceptors
84) Sides
85) Olfactory
86) Sweet
Salty
Sour
Bitter
Umami (meaty)
87) Salty
Bitter (because OH^- is a base)
88) Sour
89) Taste buds
90) The roof (the nasal epithelium)
91) 350

Short answer questions:

1) What do the extrinsic eye muscles do? In what ways are they different from the other eye muscles (the iris and the ciliary body)?

2*) The diagram below is a view of a person's eyes (as seen from looking down on the person from above). In each eye, mark the location of the blind spot with an X. Under the diagram, explain (in two or three sentences) what is the anatomical reason that we have a blind spot. In other words, what is at that spot instead of light-detecting cells?



3) If you stare at a blue-green colored dot for 30 seconds and then look at a white piece of paper, you will see a colorful after-image of the dot.

a) What color will the after-image be? _____

b) Explain briefly (2–3 sentences) what causes this phenomena:

4) Experiments have shown that for objects in our peripheral vision (the extreme sides of our field of vision), we can see the object but we have difficulty identifying its color. Explain why this is so using the anatomy of the eye.

5*) Suppose you were testing a patient's hearing using the Rinne test and the Weber test. On the Weber test, the patient reported that the tuning fork sounded quieter in their right ear. A Rinne test of their left ear showed that they could hear the tuning fork when it was on their mastoid process but not when it was next to their ear. A Rinne test of their right ear showed that they could hear the tuning fork equally when it was on their mastoid process and when it was next to their ear.

a) In which ear (left or right) does the patient have deafness?
b) Which type of deafness (conduction or sensory) does the patient have?
c) Justify your answers.

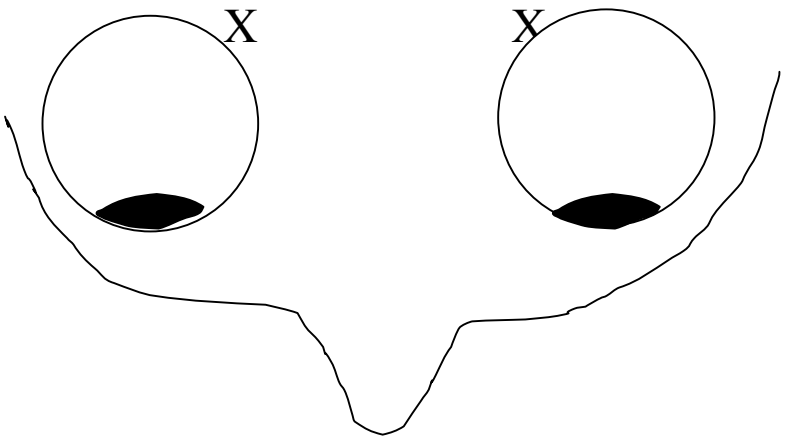
6*) When we are spun around in a circle and then come to a stop, we feel as if we are still spinning. Explain (using the anatomy of our rotation sensors) exactly why the spinning feeling persists after we stop. You may use drawings or diagrams to help clarify your explanation.

7*) Given that we only have five types of taste receptors, explain how we can differentiate the tastes of thousands of different foods?

Answers to short answer questions:

1) The extrinsic eye muscles move the eyes up, down, left, and right. They differ from the iris and ciliary body muscles in two ways: They are skeletal (voluntary) muscle, and they are on the outside of the eye.

2)



The blind spot occurs because the optic nerve passes through the retina. There is no room for photoreceptors at that location (because the optic nerve takes up that area) so we have no vision in the blind spot.

3) The afterimage would be red. The visual pigments in the green and blue cones have become temporarily bleached from staring at the blue/green dot, so only the red cones are able to fire when you look at a white piece of paper.

4) Objects at the sides of our field of vision are focused at the sides of the retina, where there are many rods but few cones. Therefore, we can see the object but have difficulty identifying its color. Objects in the center of our field of view are focused at the very back of the retina (the fovea centralis). This region is extremely rich in cones and so we have our most acute color vision in this region.

5) (a) The patient is deaf in their left ear.
(b) The patient has conduction deafness in their left ear.
(c) In the Weber test, the patient reported that the tuning fork was quieter in their right ear. This result can indicate conduction deafness in the left ear or sensory deafness in the right ear.
The results of the Rinne test on the left ear (hearing the tuning fork only when it was on the mastoid process) conform conduction deafness in the left ear.

6) Rotation is sensed when the endolymph fluid in the semi-circular canals moves. The moving endolymph bends the cilia of hair cell neurons, which results the sensation of spinning. When we stop spinning, it takes a few seconds for the endolymph to stop flowing. This results a continued feeling of spinning.

7) Even though we have only five taste receptor types, we also smell foods as we eat them. We have hundreds of different olfactory (smell) receptor types, and this allows us to differentiate the “tastes” (really the smells) of many food types.