

MULTIPLE CHOICE

1. Our perception of the environment depends on
 - a. the properties of the objects in the environment.
 - b. the properties of the electrical signals in the nervous system.
 - c. both the properties of the environmental objects and properties of the electrical signals in the nervous system.
 - d. none of these are true.

ANS: C

REF: Starting at the Beginning

MSC: Conceptual

2. Visible light is between _____ and _____ nm within the electromagnetic spectrum.
 - a. 100; 400
 - b. 400; 700
 - c. 500; 1000
 - d. 900; 1500

ANS: B

REF: Light: Stimulus for Vision

MSC: Factual

3. A wavelength of 100 nm would fall in the _____ range of the electromagnetic spectrum.
 - a. X-rays
 - b. ultraviolet rays
 - c. infrared rays
 - d. gamma rays

ANS: B

REF: Figure: Electromagnetic Spectrum

MSC: Factual

4. Light can be described in terms of wavelength, or as consisting of small packets of energy called
 - a. photons.
 - b. electrons.
 - c. ions.
 - d. pulsars.

ANS: A

REF: Light: Stimulus for Vision

MSC: Factual

5. The structure of the eye that provides about 80% of the eye's focusing power is the
 - a. iris.
 - b. pupil.
 - c. cornea.
 - d. lens.

ANS: C

REF: Light Focused by the Eye

MSC: Factual

6. Jan tries to focus on the tip of her pencil as she brings it closer to her. She feels the strain on her eye as she does this. What she is feeling in her eye is due to the process called
 - a. inhibition.
 - b. reflection.
 - c. accommodation.
 - d. assimilation.

ANS: C

REF: Demonstration: What is in Focus

MSC: Applied

7. The distance at which the lens can no longer bring a close object into focus is called the
 - a. far point.
 - b. near point.
 - c. high point.
 - d. coupee point.

ANS: B

REF: Light Focused by the Eye

MSC: Factual

8. Lorelei's mother is 60 years old. Because of the condition called _____, the closest distance at which she can focus an object is probably about _____ cm.
- a. cataracts; 20
 - b. cataracts; 40
 - c. presbyopia; 100
 - d. dermabrasion; 150

ANS: C

REF: Loss of Accommodation with Age

MSC: Applied

9. LASIK surgery is used to treat _____ by cutting a small flap in the _____.
- a. myopia; cornea
 - b. myopia; lens
 - c. hyperopia; cornea
 - d. presbyopia; lens

ANS: A

REF: Myopia

MSC: Factual

10. Individual suffering from myopia may have difficulty seeing _____ objects clearly. Often times they are also referred to as being _____.
- a. nearby; farsighted
 - b. nearby; nearsighted
 - c. distant; farsighted
 - d. distant; nearsighted

ANS: D

REF: Myopia

MSC: Factual

11. Vera has hyperopia, and tends to get headaches when she reads. This is because
- a. Vera also has presbyopia and has the constant need to accommodate.
 - b. Vera also has myopia and is unable to accommodate.
 - c. Vera has just had LASIK surgery and her ciliary muscles are damaged.
 - d. Vera is 5-years-old and lacks the visual acuity to read.

ANS: A

REF: Hyperopia

MSC: Applied

12. The visual pigment molecules are contained in the
- a. inner segments of the visual receptors.
 - b. outer segments of the visual receptors.
 - c. axons of the rods.
 - d. axons of the cones.

ANS: B

REF: Transforming Light to Electrical Energy

MSC: Factual

13. _____ reacts to light to start the process of transduction.
- a. Opsin
 - b. Retinal
 - c. Choroid
 - d. Thyric acid

ANS: B

REF: Transforming Light to Electrical Energy

MSC: Factual

14. The isomerization of a single pigment molecule triggers what is best described as a
- a. chain reaction.
 - b. ballistic expansion.
 - c. hyperactive potential.
 - d. hypopolarization wave.

ANS: A

REF: Transforming Light to Electrical Energy

MSC: Factual

15. Which of the following is true about the difference between the rods and the cones?
- The rods control vision in high illumination conditions, and the cones control vision in low illumination conditions.
 - The rods are packed in an area called the fovea, and the cones are found more in the peripheral retina.
 - There are about 120 million rods in the human eye and about 5 million cones.
 - The only difference between the rods and the cones is physical shape.

ANS: C REF: Distribution of Rods and Cones MSC: Factual

16. A retinal condition that destroys the cones in the fovea is
- macular degeneration.
 - retinitis pigmentosa.
 - presbyopia.
 - retinal hypopolarization.

ANS: A REF: Distribution of Rods and Cones MSC: Factual

17. In the early stages of _____, peripheral rod receptors are destroyed leading to poorer peripheral vision.
- macular degeneration
 - retinitis pigmentosa
 - presbyopia
 - retinal hypopolarization

ANS: B REF: Distribution of Rods and Cones MSC: Factual

18. The blind spot is located
- in the fovea.
 - in the vitreous.
 - where the optic nerve leaves the eye.
 - at the optic chiasm.

ANS: C REF: Distribution of Rods and Cones MSC: Conceptual

19. Nina does a demonstration of “seeing” the blind spot, in which a grid pattern surrounds the black dot that disappears when it falls on the blind spot. What does Nina most likely see in the area where the dot disappears?
- a blurry gray area
 - a white circle
 - nothing
 - a continuation of the grid pattern

ANS: D REF: Filling in the Blind Spot MSC: Applied

20. The episode of “Mythbusters” cited in the textbook demonstrated that dark adaptation was the reason why
- poker players wear sunglasses.
 - pirates wore eyepatches.
 - cardinals have good night vision.
 - giants have poor night vision.

ANS: B REF: Measuring the Dark Adaptation Curve
MSC: Applied

21. To isolate the rod portion of the dark adaptation curve, researchers
- use rod monochromats as the participants.
 - present the stimulus foveally.
 - present the stimulus in the periphery.
 - use cone monochromats as participants.

ANS: A REF: Measuring Rod Adaptation MSC: Conceptual

22. The “rod-cone break” in the dark adaptation curve occurs after about ____ in the dark.
- a. 30 seconds
 - b. 2 minutes
 - c. 7 minutes
 - d. 30 minutes

ANS: C

REF: Measuring Rod Adaptation

MSC: Factual

23. When visual pigments become bleached they are
- a. dead.
 - b. fully regenerated.
 - c. color sensitive.
 - d. detached from the opsin.

ANS: D

REF: Visual Pigment Regeneration

MSC: Conceptual

24. Rushton demonstrated that the physiological mechanism behind dark adaptation is
- a. visual pigment regeneration.
 - b. the enzyme cascade.
 - c. modular organization.
 - d. photon remission.

ANS: A

REF: Visual Pigment Regeneration

MSC: Conceptual

25. Cone spectral sensitivity is measured by having the observer
- a. look up and blink.
 - b. look straight forward without blinking.
 - c. look directly into a light.
 - d. look to the side of a flashing light.

ANS: C

REF: Measuring the Spectral Sensitivity Curve

MSC: Conceptual

26. The peak in the spectral sensitivity curve is about _____ for the rods, and about _____ for the cones.
- a. 700 nm; 400 nm
 - b. 450 nm; 800 nm
 - c. 500 nm; 560 nm
 - d. 600 nm; 450 nm

ANS: C

REF: Spectral Sensitivity Curve

MSC: Factual

27. The Purkinje shift
- a. is when reds appear brighter than blues in well-lit conditions, but blues appear brighter than reds in dim conditions.
 - b. is when blues appear brighter than reds in well-lit conditions, but blues appear brighter than reds in dim conditions.
 - c. is when details that are easily seen in well-lit conditions become more difficult to see in low-light conditions.
 - d. demonstrates the importance of eye movements in visual pigment regeneration.

ANS: A

REF: Spectral Sensitivity Curve

MSC: Conceptual

28. There are ____ different cone receptors, each with different absorption spectra.
- a. 2
 - b. 3
 - c. 4
 - d. 7

ANS: B

REF: Rod and Cone Absorption Spectra

MSC: Factual

29. The three major parts of a neuron are
- a. dendrites, cell body, and axon.
 - b. axon, nerve fiber, and receptor.
 - c. receptor, transmitter, and median.
 - d. receptor, dendrites, and conductor.

ANS: A

REF: Electrical Signals in Neurons

MSC: Factual

30. The difference in charge between the inside and the outside of the nerve fiber when the nerve is at rest is _____ mV.
- a. -70
 - b. -10
 - c. 0
 - d. +19

ANS: A

REF: Recording Electrical Signals in Neurons

MSC: Factual

31. Which of the following statements best defines the “propagated response”?
- a. Once a response is triggered, the response travels the length of the axon without decreasing in amplitude.
 - b. Once a response is triggered, the response gradually increases in amplitude as it travels down the length of the axon.
 - c. The response increases the positive charge of the chlorine ions throughout the length of the axon.
 - d. The number of negative potassium ions increase the closer the impulse is to the dendrites.

ANS: A

REF: Basic Properties of Action Potentials

MSC: Factual

32. As stimulus intensity is increased, recording from a single neuron shows
- a. the amplitude of the action potential increases.
 - b. the amplitude of the action potential decreases.
 - c. the amplitude of the action potential may increase or decrease, depending on the stimulus.
 - d. the rate of firing of the nerve fiber increases.

ANS: D

REF: Basic Properties of Action Potentials

MSC: Factual

33. The upper limit of a neuron’s firing rate is estimated to be _____ impulses per second.
- a. 20
 - b. 100
 - c. 800
 - d. 4400

ANS: C

REF: Basic Properties of Action Potentials

MSC: Factual

34. At the beginning of the action potential, _____ ions flow from outside the nerve fiber into the nerve fiber.
- a. positive potassium
 - b. negative potassium
 - c. positive sodium
 - d. negative sodium

ANS: C

REF: Chemical Basis of Action Potentials

MSC: Factual

35. The flow of ions that create the action potential are caused by the changes in the _____ of the nerve fiber.
- a. suppression
 - b. permeability
 - c. accommodation
 - d. assimilation

ANS: B

REF: Chemical Basis of Action Potentials

MSC: Factual

36. Synaptic vesicles contain chemicals called _____ that are released across the synapse to the next neuron.
- a. electrolytes
 - b. collagens
 - c. neurotransmitters
 - d. glial cells

ANS: C

REF: Transmitting Information Across a Gap

MSC: Factual

37. The _____ analogy is used to describe the relationship of neurotransmitters with receptor sites.
- a. “needle in a haystack”
 - b. “lock and key”
 - c. “stadium wave”
 - d. “rolling stone”

ANS: B

REF: Transmitting Information Across a Gap

MSC: Conceptual

38. _____ is the process by which inhibitory transmitters cause the inside of the neuron to become more negative.
- a. Hyperpolarization
 - b. Depolarization
 - c. Antipolarization
 - d. Repolarization

ANS: A

REF: Transmitting Information Across a Gap

MSC: Factual

39. The rate of firing of the postsynaptic neuron depends on the amount of _____ input it receives from the presynaptic neuron.
- a. excitation
 - b. inhibition
 - c. equalizing
 - d. both excitation and inhibition

ANS: D

REF: Transmitting Information Across a Gap

MSC: Factual

40. _____ is necessary for the neural transmission and processing of information.
- a. Inhibition
 - b. Excitation
 - c. Exhibition
 - d. Both inhibition and excitation

ANS: D

REF: Transmitting Information Across a Gap

MSC: Conceptual

41. Rods and cones synapse with _____ cells, which then synapse with _____ cells.
- a. ganglion; bipolar
 - b. bipolar; ganglion
 - c. amacrine; unipolar
 - d. amacrine; bipolar

ANS: B

REF: Neural Convergence and Perception

MSC: Factual

42. Converging circuits with excitation and inhibition are associated most closely with which step of the perceptual process?
- a. recognition
 - b. attention
 - c. neural processing
 - d. the environmental stimulus

ANS: C REF: Neural Convergence and Perception
MSC: Conceptual

43. If we compare how the rods and cones converge onto other retinal neurons, we find that
- a. foveal cones converge more than the peripheral rods.
 - b. rods and cones converge equally.
 - c. rods converge more than foveal cones.
 - d. horizontal cells converge onto the peripheral cones.

ANS: C REF: Neural Convergence and Perception
MSC: Factual

44. Convergence results in _____ sensitivity and _____ acuity.
- a. increased; increased
 - b. increased; decreased
 - c. decreased; decreased
 - d. decreased; increased

ANS: B REF: Neural Convergence and Perception
MSC: Conceptual

45. Reading the eye chart in an optometrist's office is used to measure
- a. acuity.
 - b. sensitivity.
 - c. receptive fields.
 - d. creativity.

ANS: A REF: Lack of Convergence Causes Better Acuity
MSC: Conceptual

46. Acuity is better in the _____ than in the _____.
- a. periphery; fovea
 - b. optic disk; fovea
 - c. optic disk; cornea
 - d. fovea; periphery

ANS: D REF: Lack of Convergence Causes Better Acuity
MSC: Factual

47. The difficulty of reading under dim light conditions can be explained by
- a. the increased sensitivity of cones under low light conditions.
 - b. the increased acuity of cones under low light conditions.
 - c. the fact that rod functioning predominates during dark adaptation, therefore poor acuity.
 - d. the fact that cone functioning predominates during dark adaptation, therefore poor acuity.

ANS: C REF: Lack of Convergence Causes Better Acuity
MSC: Conceptual

48. The stimuli used in the preferential looking technique of testing infant acuity are
- geons.
 - gratings.
 - Greebles.
 - faces.

ANS: B

REF: Infant Visual Acuity

MSC: Factual

49. Acuity develops to almost 20/20 vision by the time the infant is
- one month old.
 - two months old.
 - one year old.
 - two years old.

ANS: C

REF: Infant Visual Acuity

MSC: Factual

50. Which of the following is a reason for the poor acuity of newborns?
- The rods are not developed at birth.
 - Newborns have too much visual pigment in the cones.
 - A newborn's rods have very narrow inner segments.
 - The visual cortex of the newborn is only partially developed.

ANS: D

REF: Infant Visual Acuity

MSC: Factual

ESSAY

1. Name, define, and discuss the treatment for three kinds of focusing problems.

ANS: Answer not provided.

2. (a) Discuss the major differences between the rods and the cones.
(b) Describe two retinal disorders that differentially affect the rods and the cones.

ANS: Answer not provided.

3. (a) What is the "blind spot"?
(b) Discuss two reasons why we are not usually aware of the blind spot.

ANS: Answer not provided.

4. (a) Draw a graph (with appropriate axis labels) of the dark adaptation curve.
(b) Describe the methodology used to isolate the rod component of the curve, and the cone component.
(c) Discuss how Rushton demonstrated the physiological basis to dark adaptation.

ANS: Answer not provided.

5. (a) What are the basic properties of action potentials?
(b) How do these properties relate to perception?

ANS: Answer not provided.

6. Describe the process of synaptic transmission. Include in this description the differences between excitatory and inhibitory transmitters.

ANS: Answer not provided.

7. Using words and/or diagrams, circuits with (a) no convergence; (b) convergence; and (c) convergence with inhibition affect neural firing rate.

ANS: Answer not provided.

8. (a) In words and/or diagrams, discuss why convergence of the rods results in increased sensitivity, but decreased acuity.
(b) In words and/or diagrams, discuss why the lack of convergence in the foveal cones results in decreased sensitivity, but increased acuity.

ANS: Answer not provided.

9. Describe how preferential looking and visual evoked potentials technique have been used to study infant perception.

ANS: Answer not provided.