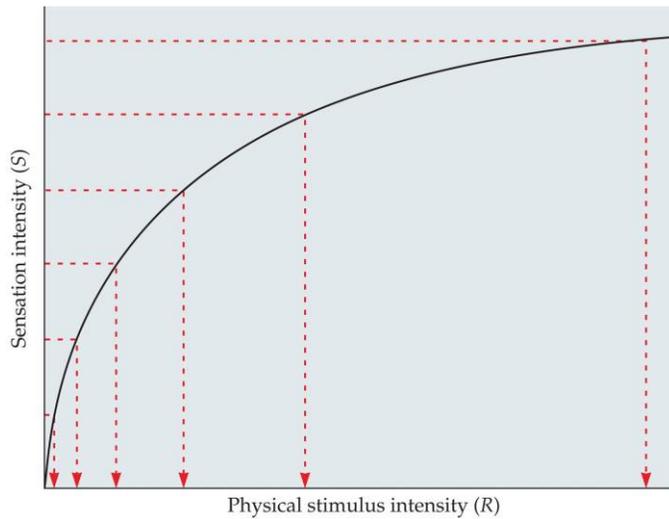


Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. \_\_\_\_\_ is the founder of psychophysics.
  - A) Berkeley
  - B) Fechner
  - C) Weber
  - D) Plato
  - E) Wundt
  
2. \_\_\_\_\_ is the science of defining quantitative relationships between physical and psychological events.
  - A) Materialism
  - B) Dualism
  - C) Fourier analysis
  - D) Signal detection theory
  - E) Psychophysics
  
3. \_\_\_\_\_ is the smallest distance at which two stimuli are just perceptible as separate.
  - A) 1 mm
  - B) 1 cm
  - C) The qualia span
  - D) Two-point touch threshold
  - E) Fechner threshold
  
4. The smallest detectable difference between two stimuli is called the
  - A) just noticeable difference.
  - B) sensitivity.
  - C) criterion.
  - D) amplitude.
  - E) phase.
  
5. JND is the
  - A) smallest detectable difference between two stimuli.
  - B) difference in detection time for two different stimuli.
  - C) true difference in detection time.
  - D) time it takes to notice a stimulus.
  - E) judgment of no detection.

6. \_\_\_\_\_ describes the relationship between a stimulus and its resulting sensation by proposing that the JND is a constant fraction of the stimulus intensity.
- A) Fourier analysis
  - B) Signal detection theory
  - C) Weber's law
  - D) Fechner's law
  - E) Stevens' power law
7. Weber proposed that the smallest change in a stimulus that can be detected is a(n) \_\_\_\_\_ proportion of the stimulus level.
- A) ever-changing
  - B) constant
  - C) opposite
  - D) small
  - E) one-fifth
8. \_\_\_\_\_ describes the relationship between a stimulus and its resulting sensation by proposing that the magnitude of the resulting sensation increases proportionally to the logarithm of the stimulus intensity.
- A) Fourier analysis
  - B) Signal detection theory
  - C) Weber's law
  - D) Fechner's law
  - E) Stevens' power law

9. The figure below is an illustration of



- A) Weber's law.
- B) Berkeley's function.
- C) Descartes' beliefs.
- D) Fechner's law.
- E) Helmholtz's curve.

10. Absolute threshold is the minimum amount of stimulation necessary for a person to detect a stimulus \_\_\_\_\_% of the time.

- A) 30
- B) 100
- C) 50
- D) 80
- E) 99

11. The method of \_\_\_\_\_ requires the random presentation of many stimuli, ranging from rarely to almost always perceivable, one at a time.

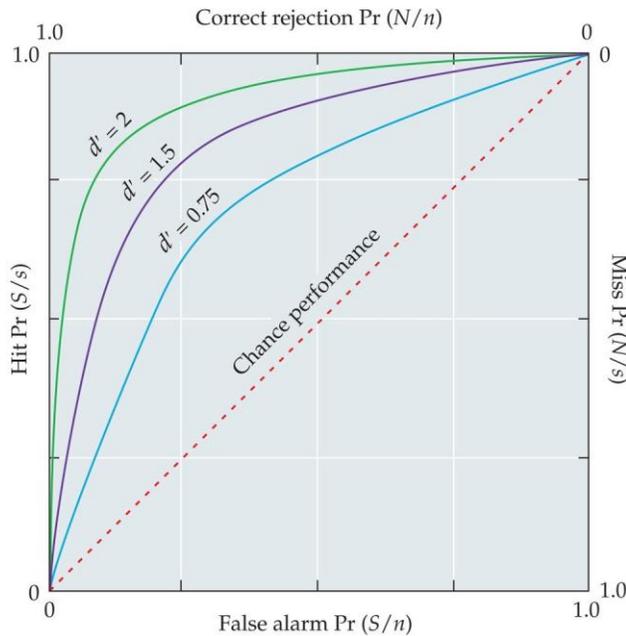
- A) limits
- B) constant stimuli
- C) adjustment
- D) sensation and perception
- E) matching

12. The method of \_\_\_\_\_ requires the experimenter to vary a perceptible stimulus until it is no longer perceived, or an imperceptible stimulus until it is finally perceived.
- A) limits
  - B) constant stimuli
  - C) adjustment
  - D) sensation and perception
  - E) matching
13. The method of \_\_\_\_\_ requires the observer to alter the strength of a stimulus until it matches some criterion.
- A) limits
  - B) constant stimuli
  - C) adjustment
  - D) sensation and perception
  - E) matching
14. \_\_\_\_\_ is a psychophysical method in which the participant assigns values according to perceived magnitudes of the stimuli.
- A) The method of limits
  - B) The method of constant stimuli
  - C) The method of adjustment
  - D) Magnitude estimation
  - E) Cross-modality matching
15. Stevens' power law describes the relationship between a \_\_\_\_\_ and a(n) \_\_\_\_\_.
- A) signal; noise
  - B) stimulus; sensation
  - C) sensation; perception
  - D) signal; receiver
  - E) receiver; operator
16. \_\_\_\_\_ is the principle that describes the relationship between a stimulus and its resulting sensation that says the magnitude of subjective sensation is proportional to the stimulus magnitude, raised to an exponent.
- A) Fourier analysis
  - B) Signal detection theory
  - C) Weber's law
  - D) Fechner's law
  - E) Stevens' power law

17. If you are asked to taste a lemon and then adjust a light until it is as bright as the lemon is sour, you have been asked to engage in
- A) magnitude estimation.
  - B) the method of constant stimuli.
  - C) the method of limits.
  - D) signal detection.
  - E) cross-modality matching.
18. Signal detection theory consists of
- A) detectors.
  - B) receivers.
  - C) transducers.
  - D) signal and noise.
  - E) thresholds.
19. In signal detection theory, the \_\_\_\_\_ is an internal threshold that is set by the observer.
- A) criterion
  - B) shift
  - C) sensitivity
  - D) method of limits
  - E) method of adjustment
20. In signal detection theory, the \_\_\_\_\_ is a value that defines the ease with which an observer can tell the difference between the presence and absence of a stimulus or the difference between stimulus 1 and stimulus 2.
- A) criterion
  - B) shift
  - C) sensitivity
  - D) method of limits
  - E) method of adjustment
21. If a stimulus is present and the observer reports it as present, this is called a
- A) hit.
  - B) miss.
  - C) false alarm.
  - D) correct rejection.
  - E) criterion.

22. If a stimulus is present and the observer reports it as absent, this is called a
- A) hit.
  - B) miss.
  - C) false alarm.
  - D) correct rejection.
  - E) criterion.
23. If a stimulus is absent but the observer reports it as present, this is called a
- A) hit.
  - B) miss.
  - C) false alarm.
  - D) correct rejection.
  - E) criterion.
24. If a stimulus is absent and the observer reports it as absent, this is called a
- A) hit.
  - B) miss.
  - C) false alarm.
  - D) correct rejection.
  - E) criterion.
25. The criminal justice system in United States is designed to be biased such that it would rather let a guilty person go free than convict an innocent person. In terms of signal detection theory, the courts would rather have a \_\_\_\_\_ than a \_\_\_\_\_.
- A) hit; miss
  - B) miss; correct rejection
  - C) correct rejection; miss
  - D) false alarm; miss
  - E) miss; false alarm
26. Airport security is very tight. If a traveler even jokes about a bomb, they are detained and questioned to ensure that no real terrorist threat succeeds. In terms of signal detection theory, airport security would rather have a \_\_\_\_\_ than a \_\_\_\_\_.
- A) hit; miss
  - B) miss; correct rejection
  - C) correct rejection; miss
  - D) false alarm; miss
  - E) miss; false alarm

27. The curves in the figure below are known as



- A) stimuli ratios.
- B) ROC curves.
- C) JNDs.
- D) signal curves.
- E) power curves.

28. \_\_\_\_\_ is a mathematical procedure by which a signal can be separated into component sine waves at different frequencies. Combining these sine waves will reproduce the original signal.

- A) Fourier analysis
- B) Signal detection theory
- C) Weber's law
- D) Fechner's law
- E) Stevens' power law

29. The time or space required for one cycle of a repeating waveform is its

- A) phase.
- B) sign.
- C) amplitude.
- D) wavelength.
- E) angle.

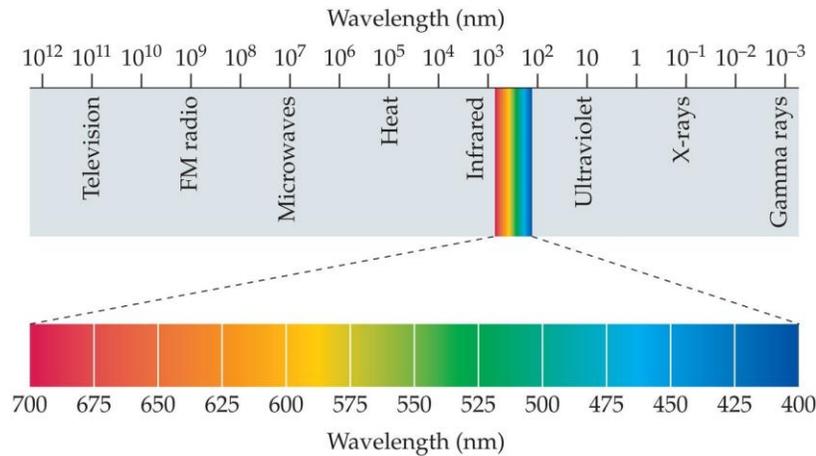
30. In a referee's uniform, the number of white and black stripes per inch could be considered its
- A) phase.
  - B) spatial frequency.
  - C) amplitude.
  - D) wavelength.
  - E) angle.
31. The doctrine of specific nerve energies involves the stimulation of
- A) sensory fibers.
  - B) sensations.
  - C) nerve endings.
  - D) signals.
  - E) All of the above
32. If you are in a completely dark room and accidentally hit your head, you might see "stars." Despite the fact that there was only mechanical stimulation to your eyes and no light, you still had an experience of light. This fact is predicted by
- A) dark adaptation.
  - B) the equal stimulation principle.
  - C) the doctrine of specific nerve energies.
  - D) the Müller principle.
  - E) Stevens' power law.
33. The twelve pairs of nerves that originate in the brain stem and reach sense organs and muscles through openings in the skull are called the
- A) Müller mileau.
  - B) specific nerves.
  - C) nervy dozen.
  - D) cranial nerves.
  - E) cranial tracts.
34. \_\_\_\_\_ invented the ophthalmoscope, studied hearing, and first determined the speed of neural impulses.
- A) Weber
  - B) Fechner
  - C) Locke
  - D) Ramón y Cajal
  - E) Helmholtz

35. A synapse is the junction between \_\_\_\_\_ that permits information transfer.
- A) stimuli
  - B) sensory fibers
  - C) neurons
  - D) signals
  - E) the spinal cord and brain
36. The chemical substance used in neuronal communication at synapses is known as
- A) axon.
  - B) receptor.
  - C) transducer.
  - D) neurotransmitter.
  - E) lymph.
37. Which of the following is a method or set of methods that generates images of the structure and/or function of the brain in living, behaving humans?
- A) X-rays
  - B) Neuroimaging
  - C) Mindscaping
  - D) Cognitive mapping
  - E) Free association
38. \_\_\_\_\_ is a technique that, using multiple electrodes on the scalp, measures changes in electrical activity across populations of many neurons in the brain.
- A) EEG
  - B) MEG
  - C) MRI
  - D) fMRI
  - E) PET
39. \_\_\_\_\_ is a technique that measures changes in magnetic activity across populations of many neurons in the brain.
- A) EEG
  - B) MEG
  - C) MRI
  - D) fMRI
  - E) PET

40. \_\_\_\_\_ is an imaging technology that uses the responses of atoms to strong magnetic fields to form images of structures, like the brain.
- A) EEG
  - B) MEG
  - C) MRI
  - D) fMRI
  - E) PET
41. \_\_\_\_\_ makes it possible to measure localized patterns of activity in the brain by tracing changing levels of blood oxygenation.
- A) EEG
  - B) MEG
  - C) MRI
  - D) fMRI
  - E) PET
42. \_\_\_\_\_ imaging technology defines locations in the brain where neurons are especially active using safe radioactive isotopes to measure the metabolism of brain cells.
- A) EEG
  - B) MEG
  - C) MRI
  - D) fMRI
  - E) PET
43. Light can be described as a stream of photons or a(n)
- A) signal.
  - B) wave.
  - C) source.
  - D) outlet of energy.
  - E) illuminant.

Use the following to answer questions 44-45:

Refer to the figure below.



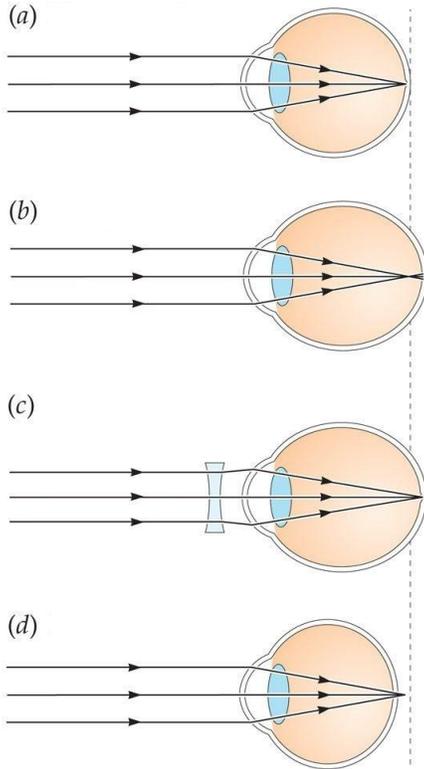
44. The right part of the figure shows the
- A) spectrum of visible light.
  - B) different kinds of light.
  - C) spectrum of electromagnetic energy.
  - D) number of photons emitted by a light source.
  - E) amount of heat emitted by a light source.
45. The left part of the figure shows the
- A) spectrum of visible light.
  - B) different kinds of light.
  - C) spectrum of electromagnetic energy.
  - D) number of photons emitted by a light source.
  - E) amount of heat emitted by a light source.
46. Light *cannot* be
- A) absorbed.
  - B) refracted.
  - C) dissolved.
  - D) transmitted.
  - E) scattered.

47. Refraction of a wave of energy means
- A) oscillation that travels through a medium.
  - B) bending or spreading out of waves as they pass through a medium.
  - C) bending or spreading out of waves as they pass the edge of an obstacle.
  - D) passing of waves with no interruption.
  - E) redirection of light back toward its source.
48. When something strikes a surface, especially light, sound, or heat, and is redirected (usually back toward its point of origin), it is being
- A) refracted.
  - B) transmitted.
  - C) scattered.
  - D) reflected.
  - E) absorbed.
49. The transparent “window” on the outer part of the eye that allows light into the eyeball is called the
- A) pupil.
  - B) iris.
  - C) lens.
  - D) retina.
  - E) cornea.
50. The aqueous humor is a(n)
- A) funny substance.
  - B) watery fluid between the cornea and iris.
  - C) gel-like fluid between the lens and retina.
  - D) circular opening at the center of the iris.
  - E) opaque fluid.
51. The vitreous humor is a(n)
- A) funny substance.
  - B) watery fluid between the cornea and iris.
  - C) gel-like fluid between the lens and retina.
  - D) circular opening at the center of the iris.
  - E) opaque fluid.

52. The dark, circular opening at the center of the eye, where light enters the eye is called the
- A) pupil.
  - B) iris.
  - C) lens.
  - D) retina.
  - E) cornea.
53. The colored part of the eye, consisting of a muscular diaphragm, is called the
- A) pupil.
  - B) iris.
  - C) lens.
  - D) retina.
  - E) cornea.
54. The structure that becomes thicker or thinner to allow images to be focused onto the back of the eye is called the
- A) pupil.
  - B) iris.
  - C) lens.
  - D) retina.
  - E) cornea.
55. The light-sensitive membrane at the back of the eye that contains rods and cones is called the
- A) pupil.
  - B) iris.
  - C) lens.
  - D) retina.
  - E) cornea.
56. The retina
- A) is the tough outer covering that protects the eye.
  - B) contains watery fluid.
  - C) focuses the image.
  - D) diffracts light.
  - E) contains rods and cones.

57. In people with \_\_\_\_\_, which of the following does *not* require optical correction to see normally?
- A) myopia
  - B) hyperopia
  - C) astigmatism
  - D) emmetropia
  - E) All of the above require optical correction.
58. Which of the following is a unit of measurement of the optic power of a lens?
- A) Diopter
  - B) Visual angle
  - C) Accommodation
  - D) Hertz
  - E) Wavelength
59. Which of the following refers to nearsightedness?
- A) Myopia
  - B) Hyperopia
  - C) Astigmatism
  - D) Emmetropia
  - E) All of the above refer to nearsightedness.

60. Which of the following (*a–d*) depict(s) hyperopia?

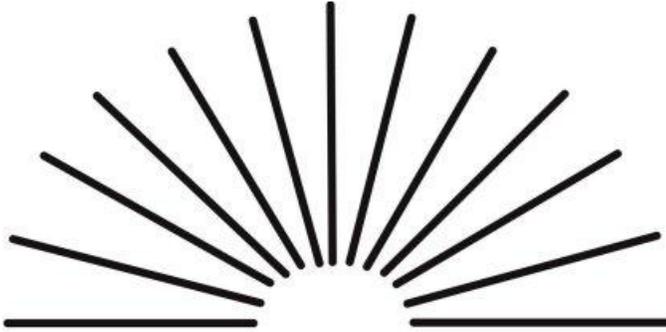


- A) *a*
- B) *b*
- C) *c*
- D) *d*
- E) All of the above

61. Accommodation is the process during which the \_\_\_\_\_ of the eye changes its shape.

- A) retina
- B) lens
- C) pupil
- D) iris
- E) cornea

62. The chart below is used to test for



- A) myopia.
- B) hyperopia.
- C) astigmatism.
- D) macular degeneration.
- E) retinitis pigmentosa.

63. Literally “old sight,” this term refers to age-related loss of accommodation, which makes it difficult to focus on near objects.

- A) Emmetropia
- B) Hyperopia
- C) Macular degeneration
- D) Retinitis pigmentosa
- E) Presbyopia

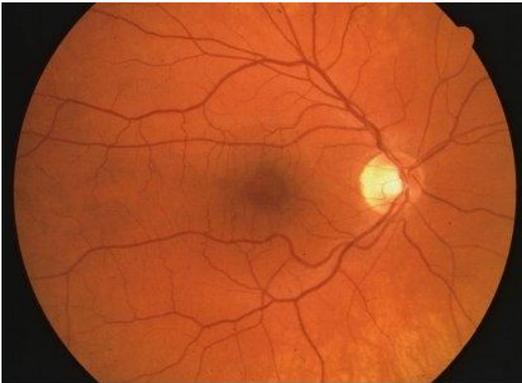
64. The retina is analogous to the \_\_\_\_\_ in a camera.

- A) lens
- B) stop
- C) flash
- D) film
- E) shutter

65. The iris is analogous to the \_\_\_\_\_ in a camera.

- A) lens
- B) stop
- C) flash
- D) film
- E) shutter

66. The light energy from an object is \_\_\_\_\_ into neural energy that can be interpreted by the brain.
- A) transferred
  - B) transformed
  - C) transduced
  - D) absorbed
  - E) translated
67. As shown in the image below, eye doctors use an instrument called an ophthalmoscope to look at the \_\_\_\_\_ of their patients' eyes.



- A) cornea
  - B) iris
  - C) lens
  - D) focal point
  - E) fundus
68. Which of the following senses light?
- A) Ganglion cells
  - B) Rods and cones
  - C) Horizontal cells
  - D) Amacrine cells
  - E) Bipolar cells
69. Rods are photoreceptors that are specialized for
- A) daylight vision.
  - B) sensing rod-like objects.
  - C) transmitting light.
  - D) night vision.
  - E) processing color.

70. Photoreceptors that are specialized for daylight vision, fine acuity, and color are called
- A) duplexes.
  - B) cones.
  - C) ganglion cells.
  - D) bipolar cells.
  - E) rods.
71. The retina can be referred to as \_\_\_\_\_ because it contains both rods and cones, which operate under different conditions.
- A) a focal point
  - B) a shutter
  - C) duplex
  - D) a light-passing membrane
  - E) bipartisan
72. The high-resolution part of the eye that is used for detailed vision is called the
- A) cornea.
  - B) lens.
  - C) iris.
  - D) sclera.
  - E) fovea.
73. \_\_\_\_\_ refers to the distance between the location of a retinal image and the fovea.
- A) Degradation
  - B) Density
  - C) Circularity
  - D) Eccentricity
  - E) Signal strength
74. The part of the photoreceptor that contains photopigment molecules is called the \_\_\_\_\_.
- A) retina
  - B) outer segment
  - C) inner segment
  - D) synaptic terminal
  - E) vitreous humor

75. \_\_\_\_\_ is the visual pigment found in rods.
- A) Macular pigment
  - B) Aqueous humor
  - C) Rhodopsin
  - D) Chromopsin
  - E) Vitreous humor
76. Lateral inhibition is the
- A) increase in activation caused by nearby regions of the retina.
  - B) measure of the finest detail that one can resolve.
  - C) process of inhibiting light from moving.
  - D) processing of inhibitory cells.
  - E) antagonistic neural interaction between adjacent regions of the retina.
77. Which of the following is a specialized retinal cell responsible for lateral inhibition?
- A) Amacrine cell
  - B) Bipolar cell
  - C) Ganglion cell
  - D) Horizontal cell
  - E) Photoreceptor
78. Retinal cells that make connections with bipolar cells, ganglion cells, and other cells like themselves are called
- A) amacrine cells.
  - B) cones.
  - C) horizontal cells.
  - D) chromophores.
  - E) rods.
79. Which of the following are retinal cells that synapse with photoreceptors, horizontal cells, and ganglion cells?
- A) Amacrine cells
  - B) Bipolar cells
  - C) Chromophores
  - D) Cones
  - E) Rods

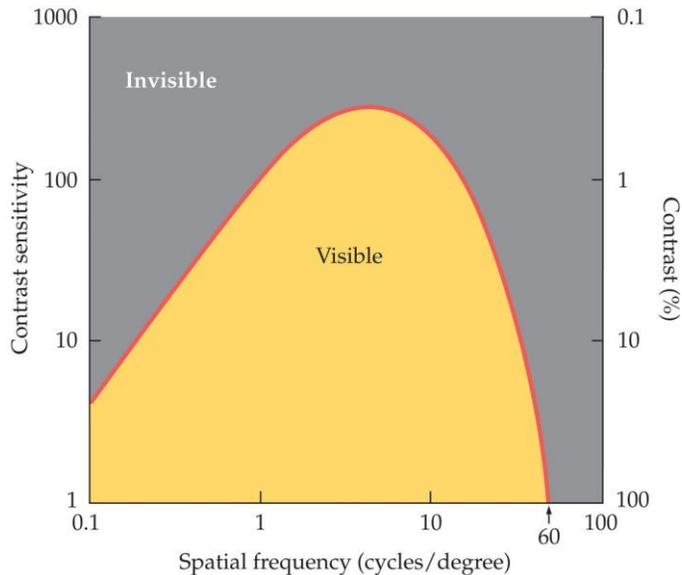
80. In the fovea, single cones pass information to single ganglion cells via \_\_\_\_\_ cells.
- A) horizontal
  - B) amacrine
  - C) midget bipolar
  - D) diffuse bipolar
  - E) All of the above
81. Retinal cells called \_\_\_\_\_ leave the eye via the optic nerve and transmit information to the brain and midbrain.
- A) Amacrine cells
  - B) Bipolar cells
  - C) Ganglion cells
  - D) Horizontal cells
  - E) Photoreceptors
82. The vertical pathway in the retina consists of all of the following *except*
- A) photoreceptors.
  - B) amacrine cells.
  - C) bipolar cells.
  - D) ganglion cells.
  - E) Both c and d
83. The lateral pathway in the retina consists of all of the following *except*
- A) photoreceptors.
  - B) amacrine cells.
  - C) horizontal cells.
  - D) ganglion cells.
  - E) Both a and d
84. A neuron will *not* fire if a stimulus does not activate its
- A) action potential.
  - B) receptive field.
  - C) central region.
  - D) photoreceptor.
  - E) axon.

85. Which of the following stimuli would optimally activate an ON-center ganglion cell?
- A) A spot of light in the center of the receptive field
  - B) A shadow in the center of the receptive field
  - C) A ring of light covering the surround of the receptive field
  - D) A large spot of light covering both the center and surround portions of the receptive field
  - E) A large shadow covering both the center and surround portions of the receptive field
86. Which of the following stimuli would optimally activate an OFF-center ganglion cell?
- A) A spot of light in the center of the receptive field
  - B) A shadow in the center of the receptive field
  - C) A ring of shadow covering the surround of the receptive field
  - D) A large spot of light covering both the center and surround portions of the receptive field
  - E) A large shadow covering both the center and surround portions of the receptive field
87. P ganglion cells are different than M ganglion cells in that P ganglion cells
- A) have larger receptive fields than M ganglion cells do.
  - B) are more sensitive to motion than M ganglion cells are.
  - C) synapse with more photoreceptors than M ganglion cells do.
  - D) operate better in low-light conditions than M ganglion cells do.
  - E) are more sensitive to color than M ganglion cells are.
88. Light and dark adaptation can occur by
- A) lateral inhibition.
  - B) changes in photoreceptor concentration.
  - C) pupil constriction or dilation.
  - D) Both b and c
  - E) All of the above
89. In retinitis pigmentosa, there is
- A) regeneration of too many photoreceptors.
  - B) degeneration of the pigment epithelium.
  - C) loss of macular opacity.
  - D) loss of the ability to use the lens in order to focus.
  - E) loss of color in the iris of the eye.

90. In aging-related macular degeneration (AMD) there is a \_\_\_\_\_ loss of \_\_\_\_\_ vision.
- A) sudden; peripheral
  - B) gradual; peripheral
  - C) sudden; central
  - D) gradual; central
  - E) complete; all
91. The difference in illumination between a figure and its background is known as
- A) contrast.
  - B) definition.
  - C) visual angle.
  - D) surround.
  - E) brightness.
92. The smallest spatial detail that can be resolved at 100% contrast is known as
- A) sharpness.
  - B) acuity.
  - C) spatial frequency.
  - D) visual angle.
  - E) phase.
93. Visual angle is a measure of the
- A) actual size of an object.
  - B) perceived size of an object.
  - C) angle between the observer and an object.
  - D) object's contrast divided by its spatial frequency.
  - E) size an object takes up on the retina.
94. Eye doctors specify acuity in terms like *20/20*, but vision scientists prefer to talk about the smallest \_\_\_\_\_ of a cycle of a grating that one can perceive.
- A) sine wave
  - B) segment
  - C) visual angle
  - D) viewing distance
  - E) width

95. If somebody has 20/100 vision, this means that
- A) they see at 20 feet what a person with normal vision sees at 100 feet.
  - B) they see at 100 feet what a person with normal vision sees at 20 feet.
  - C) they see only 20/100 or 1/5 as well as a person with normal vision.
  - D) only 20 of 100 people have vision as poor as theirs.
  - E) only 20 of 100 people have vision better than theirs.
96. Spatial frequency refers to the
- A) flicker rate of a grating.
  - B) distance between the observer and a grating.
  - C) amount of contrast in a room.
  - D) contrast threshold.
  - E) number of cycles of a grating per unit of visual angle.
97. The spatial frequency of a stimulus is measured in
- A) Snellen units.
  - B) angles per degree.
  - C) cycles per second.
  - D) cycles per degree.
  - E) degrees per second.
98. The \_\_\_\_\_ function describes how spatial frequency and contrast interact to make a grating more or less visible.
- A) spatial frequency
  - B) contrast sensitivity
  - C) spatial layout
  - D) grating positioning
  - E) visual angle
99. \_\_\_\_\_ is the smallest amount of contrast required to detect a pattern.
- A) Spatial frequency
  - B) Visual acuity
  - C) Luminance threshold
  - D) Contrast threshold
  - E) Activation threshold

100. What does the “visible” region in the figure below refer to?

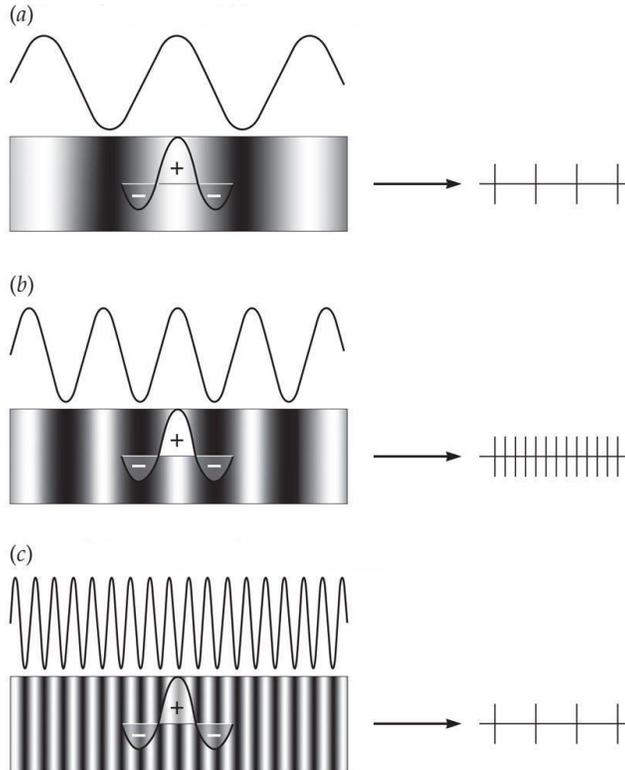


- A) Acuity
- B) The visibility of any object whose spatial frequencies and contrasts fall within it
- C) The degree to which one can see from a distance of 20 feet
- D) The lowest contrast one can distinguish
- E) The distance at which an eye chart should be readable to a normal observer

101. Scientists study contrast sensitivity for sine wave gratings because

- A) patterns of stripes with fuzzy boundaries are common in the real world.
- B) the eye is especially sensitive to sine wave gratings.
- C) sine wave gratings involve no shadows.
- D) sine wave gratings are easy to study.
- E) contrast sensitivity is easy to study.

102. The retinal ganglion cell depicted below is most responsive to which spatial frequency?



- A) Low frequency (top)
- B) Medium frequency (middle)
- C) High frequency (bottom)
- D) Both low and high frequencies (top and bottom)
- E) There is no difference in the responses of the cells shown to different frequencies.

103. Each retinal ganglion cell responds not only to spots of light but also to certain

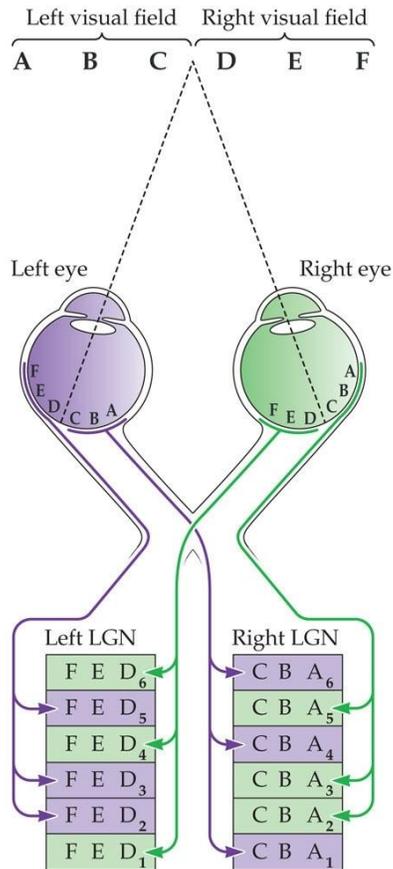
- A) fields of uniform gray.
- B) circles of uniform gray.
- C) squares of uniform gray.
- D) patterns of stripes.
- E) motion directions.

104. The axons of retinal ganglion cells synapse in the two

- A) magnocellular layers.
- B) parvocellular layers.
- C) cortexes.
- D) koniocellular layers.
- E) lateral geniculate nuclei.

105. \_\_\_\_\_ neurons are found in the lateral geniculate nucleus (LGN).
- A) Magnocellular
  - B) Parvocellular
  - C) Koniocellular
  - D) All of the above
  - E) None of the above
106. Topographical mapping is the
- A) layout of the brain.
  - B) guide to the structures of the brain.
  - C) simultaneous mapping of two objects in the visual system.
  - D) orderly mapping of the world in the LGN and visual cortex.
  - E) mapping of gyri and sulci in the brain.
107. The right visual field projects to the \_\_\_\_\_ half of each eye and then is analyzed by the LGN in the \_\_\_\_\_ hemisphere.
- A) left; left
  - B) left; right
  - C) right; left
  - D) right; right
  - E) upper; left

108. In the figure below, the right LGN contains information from the



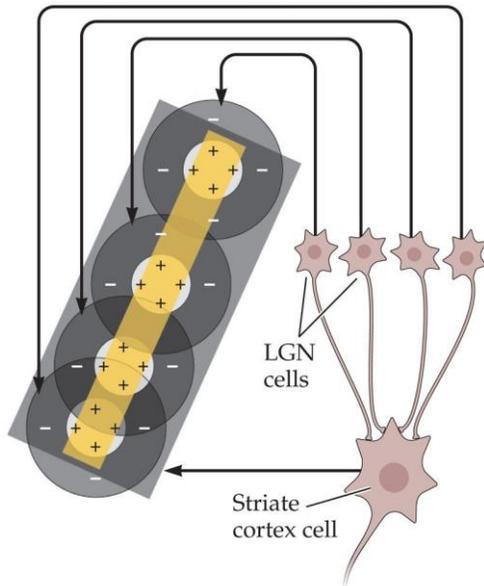
- A) left visual field.
- B) right visual field.
- C) right eye.
- D) left eye.
- E) magnocellular layer.

109. Each of the following are different names for the same structure *except*

- A) area V1.
- B) primary visual cortex.
- C) LGN.
- D) striate cortex.
- E) All of the above are different names for the same structure.

110. Cortical magnification is the \_\_\_\_\_ devoted to a specific region in the visual field.
- A) topographical map
  - B) amount of cortical area
  - C) amount of magnification
  - D) number of neuronal connections
  - E) amount of retina
111. The deleterious effect of clutter on peripheral object recognition is known as
- A) clutter induced blindness.
  - B) lateral agnosia.
  - C) horizontal masking.
  - D) visual noise.
  - E) visual crowding.
112. Hubel and Wiesel uncovered some important properties of the \_\_\_\_\_ of neurons in the striate cortex.
- A) photoreceptors
  - B) neurotransmitters
  - C) axons
  - D) dendrites
  - E) receptive fields
113. The tendency of neurons in striate cortex to respond optimally to certain orientations and less to others is known as
- A) spatial frequency.
  - B) spatial selection.
  - C) orientation tuning.
  - D) cortical magnification.
  - E) orientation agnosia.

114. What does the figure below show?



- A) How images end up on the retina
- B) The firing patterns of four cells
- C) How cortical simple cells get their orientation tuning
- D) How simple cells and complex cells interact
- E) How magnocellular and parvocellular cells interact

115. A neuron that allows the passage of some frequencies and blocks the passage of others is a

- A) filter.
- B) selector cell.
- C) ganglion cell.
- D) bipolar cell.
- E) contrast cell.

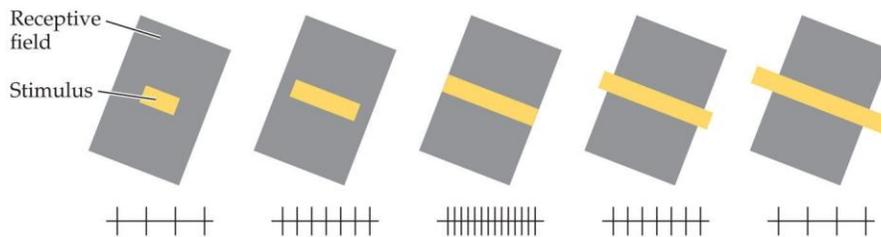
116. Which of the following terms refers to the fact that striate cortex neurons tend to respond more strongly to stimuli presented in one eye as compared to the other?

- A) Cortical magnification
- B) Ocular dominance
- C) Filtering
- D) End stopping
- E) Orientation tuning

117. A \_\_\_\_\_ cell is a neuron whose receptive field does *not* have clearly defined excitatory and inhibitory regions.
- A) simple
  - B) complex
  - C) stop
  - D) ganglion
  - E) blob

118. End stopping is the process by which cells in the cortex first \_\_\_\_\_ their firing rate as the bar length \_\_\_\_\_ to fill up its receptive field, and then \_\_\_\_\_ their firing rate as the bar is lengthened further.
- A) decrease; increases; decrease
  - B) increase; decreases; decrease
  - C) stop; increases; increase
  - D) increase; increases; decrease
  - E) decrease; decreases; increase

119. What phenomenon does the figure below demonstrate?



- A) Cortical magnification
  - B) Ocular dominance
  - C) Filtering
  - D) End stopping
  - E) Orientation tuning
120. Hubel and Wiesel concluded that neurons with similar orientation preferences were arranged in \_\_\_\_\_ that extended vertically through the cortex.
- A) stacks
  - B) branches
  - C) rows
  - D) tangles
  - E) columns

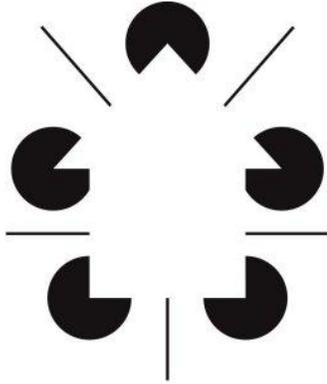
121. A \_\_\_\_\_ is a 1-mm block of striate cortex containing two sets of columns, each covering every possible orientation (0-180 degrees), with one set preferring input from the left eye and the other set preferring input from the right eye.
- A) stack
  - B) hypercolumn
  - C) CO blob
  - D) simple cell
  - E) complex cell
122. \_\_\_\_\_ is an enzyme used to reveal the regular array of CO blobs, which are spaced about 0.5 mm apart in the primary visual cortex.
- A) Chromophore
  - B) Rhodopsin
  - C) Cytochrome oxidase
  - D) Carbon dioxide
  - E) Carbon monoxide
123. Which aspect of a visual stimulus do neurons in CO blobs process?
- A) Blur
  - B) Orientation
  - C) Spatial Frequency
  - D) Motion
  - E) Color
124. The diminishing response of a sense organ to a sustained stimulus is referred to as
- A) constant stimulation.
  - B) response decrease.
  - C) adaptation.
  - D) accommodation.
  - E) convergence.
125. The tilt aftereffect is the perceptual illusion of tilt, produced by
- A) adapting to a pattern of a given orientation.
  - B) changing the direction of gaze.
  - C) tilting the head.
  - D) constantly moving the head.
  - E) spinning in circles for 30 seconds.

126. No single neuron receives input from both eyes until the
- A) LGN.
  - B) striate cortex.
  - C) parietal lobe.
  - D) magnocellular layer.
  - E) parvocellular layer.
127. Spatial frequency channels are often referred to as
- A) a set of simple cells.
  - B) a set of complex cells.
  - C) orientation tuned cells.
  - D) filters.
  - E) pattern analyzers.
128. If a movie projector is out of focus and the images on the screen are blurry, which spatial frequencies are missing?
- A) Low frequencies
  - B) High frequencies
  - C) Horizontal frequencies
  - D) Vertical frequencies
  - E) All of the above
129. Which experimental technique is used to determine which stimuli infants can and cannot see?
- A) Signal detection
  - B) Method of constant stimuli
  - C) Preferential looking paradigm
  - D) Method of adjustment
  - E) Method of limits
130. \_\_\_\_\_ is a developmental disorder characterized by reduced spatial vision in an otherwise healthy eye, even with proper correction for refractive error.
- A) Astigmatism
  - B) Anisometropia
  - C) Strabismus
  - D) Amblyopia
  - E) Hyperopia

131. \_\_\_\_\_ is a misalignment of the two eyes such that a single object in space is imaged on the fovea of one eye and on the nonfoveal area of the other (turned) eye.
- A) Astigmatism
  - B) Anisometropia
  - C) Strabismus
  - D) Amblyopia
  - E) Hyperopia
132. \_\_\_\_\_ is a condition in which the two eyes have different refractive errors.
- A) Astigmatism
  - B) Anisometropia
  - C) Strabismus
  - D) Amblyopia
  - E) Hyperopia
133. Which of the following areas is/are *not* part of extrastriate cortex?
- A) V1
  - B) V2
  - C) V3
  - D) V4
  - E) Both V2 and V4
134. Which of the following techniques has been used to study how brain structures process objects?
- A) Lesioning studies
  - B) Functional magnetic resonance imaging
  - C) Behavioral experiments with patients suffering from agnosia
  - D) Single cell recording
  - E) All of the above
135. \_\_\_\_\_ is a failure to recognize objects in spite of the ability to see them.
- A) Prosopagnosia
  - B) Agnosia
  - C) Anomia
  - D) Alexia
  - E) Dyslexia

136. Evidence indicates that structures in \_\_\_\_\_ cortex are especially important in end-stage object recognition processes.
- A) striate
  - B) inferotemporal
  - C) occipital
  - D) parietal
  - E) frontal
137. The term “grandmother cell” refers to a neuron that
- A) responds best to one specific object.
  - B) divides several times to form a number of new neurons.
  - C) is connected to a large number of other neurons.
  - D) is isolated from other neurons.
  - E) None of the above
138. A study of cells in IT cortex showed that they responded to very specific stimuli, such as
- A) faces.
  - B) celebrities.
  - C) colors.
  - D) motion.
  - E) animals.
139. A \_\_\_\_\_ process is one that carries out a computation (e.g., object recognition) one neural step after another, without the need for feedback from a later stage to an earlier stage.
- A) reentrant
  - B) feedback
  - C) feed-forward
  - D) synchronous
  - E) asynchronous
140. Which of the following is a loosely defined stage of visual processing that comes after basic features have been extracted from the image, and before object recognition and scene understanding?
- A) Low-level vision
  - B) Early vision
  - C) Middle vision
  - D) High-level vision
  - E) Hindsight

141. The figure below depicts



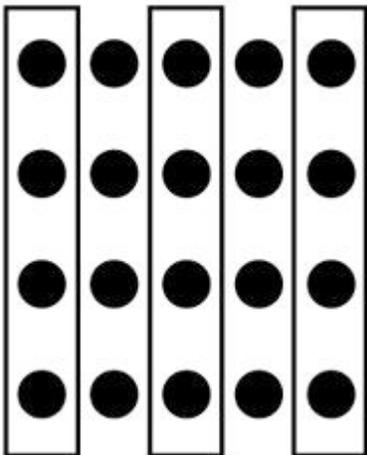
- A) isoluminant contours.
- B) an accidental viewpoint.
- C) shadow boundaries.
- D) an ambiguous figure.
- E) illusory contours.

142. Gestalt psychologists emphasize that

- A) a percept is nothing more than the sum of its sensory elements.
- B) objects and faces are processed via different mechanisms.
- C) the perceptual whole is greater than the sum of its parts.
- D) the visual system must assume that objects are viewed from generic viewpoints.
- E) object recognition is view-based.

Use the following to answer questions 143-144:

Refer to the figure below.



143. Which Gestalt grouping principle might lead you to organize the elements into *rows*?
- A) Similarity
  - B) Proximity
  - C) Common region
  - D) Parallelism
  - E) Good continuation

144. Which Gestalt grouping principle might lead you to organize the elements into *columns*?
- A) Similarity
  - B) Proximity
  - C) Common region
  - D) Parallelism
  - E) Good continuation

Use the following to answer questions 145-146:

Refer to the figure below.



145. You probably organized Figure I into one jagged line and one curved line. Which Gestalt grouping principle guided this decision?
- A) Similarity
  - B) Symmetry
  - C) Connectedness
  - D) Good continuation
  - E) Proximity
146. Figure II is like Figure I in many ways, but you organize it differently. Which Gestalt grouping principle explains why the black part seems separate from the gray part?
- A) Similarity
  - B) Symmetry
  - C) Connectedness
  - D) Good continuation
  - E) Proximity

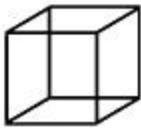
147. Which Gestalt grouping principle states that elements that change at the same time should be grouped together?

- A) Synchrony
- B) Common fate
- C) Good continuation
- D) Parallelism
- E) Similarity

148. Which Gestalt grouping principle states that elements moving in the same direction should be grouped together?

- A) Synchrony
- B) Common fate
- C) Good continuation
- D) Parallelism
- E) Similarity

149. The figure below is a classic demonstration of



- A) illusory contours.
- B) an accidental viewpoint.
- C) shadow boundaries.
- D) an ambiguous figure.
- E) texture segmentation.

150. Which of the following is a viewing position that produces some regularity in the visual image that is not present in the world?

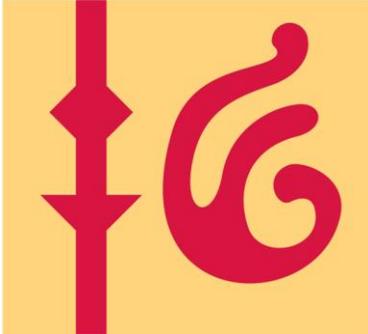
- A) Accidental viewpoint
- B) Pose
- C) Rotation
- D) Good continuation
- E) Image template

151. The word “figure” in the term “figure-ground assignment” refers to

- A) a group of separate lines that must be combined into a single object contour.
- B) the number of distinct objects in an image.
- C) the main object that is to be recognized in an image.
- D) the “correct” interpretation of an ambiguous figure.
- E) the background upon which an object is located.

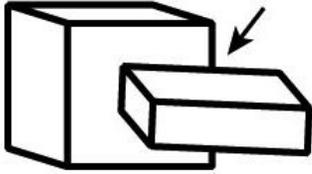
Use the following to answer questions 152-153:

Refer to the figure below.



152. Which portion of the figure is interpreted as “ground” according to the Gestalt figure-ground assignment principles?
- A) The red portion
  - B) The yellow portion
  - C) Both the red and yellow portions
  - D) Neither the red nor the yellow portions
  - E) There is no “ground” portion in the figure
153. Which Gestalt figure-ground assignment principle is most responsible for this interpretation of “ground”?
- A) Symmetry
  - B) Size
  - C) Parallelism
  - D) Surroundedness
  - E) Proximity
154. The principle of relatability helps us to understand
- A) when edges are and are not amodally completed behind occluders.
  - B) the power of nonaccidental features in image interpretation.
  - C) how conflicts between different Gestalt grouping principles are resolved.
  - D) which interpretation is given to an ambiguous figure.
  - E) which regions are segmented in textures.

155. In the figure below, the *T* junction the arrow is pointing to represents which of the following?

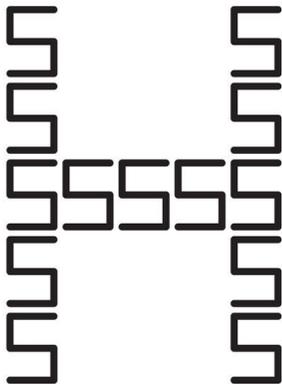


- A) Interior corner
- B) Exterior corner
- C) Occlusion
- D) Relatability
- E) An accidental feature

156. The visual system tends to divide an object into parts by “cutting” it at \_\_\_\_\_ in its silhouette.

- A) nonaccidental features
- B) both convexities and concavities
- C) convexities (bumps)
- D) concavities (valleys)
- E) the longest axis

157. Navon found that in figures like the one below, the big letter (*H*) interfered with the naming of the small letters (*S*) more than the small letters interfered with the big. This finding indicates that



- A) it is easier to name smaller objects than it is to name larger objects.
- B) it is easier to name larger objects than it is to name smaller objects.
- C) we process global aspects of an image before local aspects.
- D) we process local aspects of an image before global aspects.
- E) certain letters are more recognizable than others.

158. Which of the following is *not* one of the principles for summarizing middle vision?
- A) Bring together that which should be brought together.
  - B) Split asunder that which should be split asunder.
  - C) Use what you know.
  - D) Avoid accidents.
  - E) Seek ambiguity and avoid consensus.
159. Which formal, mathematical approach to modeling perception takes into consideration both the current stimulus and our knowledge about the conditions of the world?
- A) Gestalt grouping principles
  - B) Pandemonium model
  - C) Recognition-by-components
  - D) Bayesian approach
  - E) Template theory
160. Which of the following is *not* a cortical area that has been identified as processing very specific forms of visual stimuli?
- A) Fusiform face area (FFA)
  - B) Parahippocampal place area (PPA)
  - C) Extrastriate motion pericortex (EMP)
  - D) Extrastriate body area (EBA)
  - E) Middle temporal area (MT)
161. What are object representations made of, according to the recognition-by-components model of object recognition?
- A) Surfaces
  - B) Edges
  - C) Image templates
  - D) Geon structural descriptions
  - E) None of the above
162. What are object representations made of, according to view-based theories of object recognition?
- A) Surfaces
  - B) Edges
  - C) Image templates
  - D) Geon structural descriptions
  - E) None of the above

163. A major problem with naïve template theories of object recognition is that
- A) we cannot possibly store enough templates in memory to match every object we might encounter.
  - B) template theories predict that object recognition should usually be viewpoint invariant, but in fact recognition has been shown to viewpoint dependent.
  - C) template theories predict that object recognition should usually be viewpoint dependent, but in fact recognition has been shown to viewpoint invariant.
  - D) templates are only useful when recognizing objects from accidental viewpoints.
  - E) templates are too abstract to be used in object recognition.
164. Viewpoint invariance refers to the idea that
- A) any image should be interpretable as one and only one object.
  - B) objects should cast the same image on the retina when viewed from any viewpoint.
  - C) an object can only be recognized quickly if it is always seen from the same viewpoint.
  - D) objects should be just as easy to recognize from any viewpoint.
  - E) object viewpoints are all stored as separate templates.
165. A major problem with structural description theories of object recognition is that
- A) we cannot possibly store enough structural descriptions in memory to match every object we might encounter.
  - B) structural description theories predict that object recognition should usually be viewpoint invariant, but in fact recognition has been shown to viewpoint dependent.
  - C) structural description theories predict that object recognition should usually be viewpoint dependent, but in fact recognition has been shown to viewpoint invariant.
  - D) structural descriptions are only useful when recognizing objects from accidental viewpoints.
  - E) structural descriptions are too specific to be used in object recognition.
166. Tarr and his colleagues found that the amount of time needed to recognize novel objects is at least partially determined by
- A) the color of the object.
  - B) the complexity of the outline of the object.
  - C) whether or not the object is mirror-reversed from its studied view.
  - D) whether or not the object can be described in terms of geons.
  - E) the degree to which the object is rotated from its studied view.

167. Which of the following is an entry-level category term?
- A) Bird
  - B) Sparrow
  - C) Animal
  - D) Limousine
  - E) All of the above
168. Which of the following is a superordinate level category term?
- A) Car
  - B) Station wagon
  - C) Vehicle
  - D) Limousine
  - E) All of the above
169. Which of the following is a subordinate level category term?
- A) Car
  - B) Automobile
  - C) Vehicle
  - D) Limousine
  - E) All of the above
170. The fact that faces are more difficult than many other types of objects to recognize when viewed upside-down is taken by many researchers to indicate that
- A) faces are recognized via structural descriptions.
  - B) it is more difficult to segment faces from their backgrounds than other types of objects.
  - C) face recognition cannot be doubly dissociated from object recognition.
  - D) face recognition can be doubly dissociated from object recognition.
  - E) the visual system uses special recognition processes for faces that are not used for other types of objects.
171. Prosopagnosia is a neuropsychological disorder in which the patient
- A) cannot recognize objects at the basic level.
  - B) cannot recognize objects at the superordinate level.
  - C) can identify faces, but cannot recognize other types of objects.
  - D) cannot identify faces, but can recognize other types of objects.
  - E) can recognize objects but cannot name them.

172. What kind of processes in the brain send signals back downstream to earlier areas after initial processing?
- A) Recursive
  - B) Feed-forward
  - C) Reentrant
  - D) Dorsal
  - E) Ventral