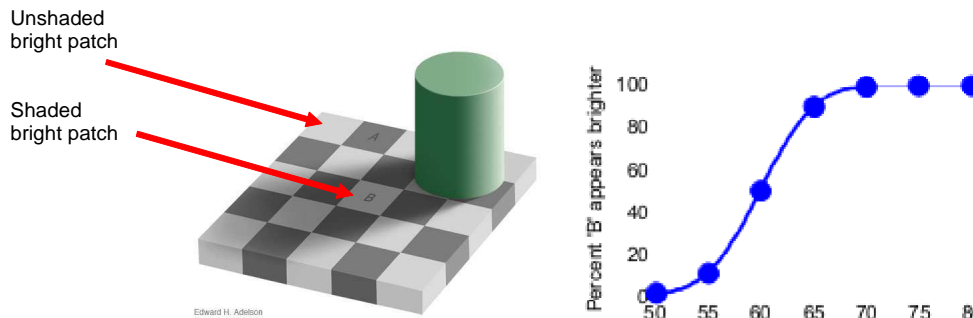


Psych 333, Winter 2008, Instructor Boynton, Exam 1

Multiple Choice

There are 35 multiple choice questions worth one point each. Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. In the figure below to the right, suppose the method of constant stimuli was used to measure the perceived lightness of the shaded bright patch (labeled 'B') compared to the unshaded bright patch. On each trial, the intensity at 'B' varied and the subject was asked whether 'B' looked brighter or darker than the unshaded bright patch. Suppose the subject generated the psychometric function on the right.



Ac

According to this data, what intensity of patch 'B' best matched the perceived intensity of the unshaded bright patch?

- a. 65
b. 60
c. 55
d. 70
e. 50
- _____ 2. Which of the following sensory dimensions has an *expansive* power function for magnitude estimation?
a. lifted weight
b. electric shock
c. sound intensity
d. light intensity
- _____ 3. The highest density of cones are found in
a. the periphery.
b. the fovea.
c. the blind spot.
d. the optic nerve.
- _____ 4. In normal humans, the left LGN receives inputs from
a. only cones
b. only the contralateral eye
c. both eyes
d. only rods
- _____ 5. Which best describes receptive fields of LGN neurons?
a. complex
b. simple
c. orientation selective
d. center/surround
e. argumentative
- _____ 6. The advantage of many rods converging to few ganglion cells is:
a. better light sensitivity
b. better frequency discrimination
c. better spatial resolution
d. better color vision

- ____ 7. Photoreceptors in the eye adapt to higher light levels by
- decreasing their proportion of isomerized retinal molecules
 - decreasing their convergence to ganglion cells
 - depleting their supply of neurotransmitters
 - switching over to the cone system
- ____ 8. A neuron signals an increase in stimulus intensity by increasing the _____ of the spikes.
- amplitude
 - velocity
 - frequency
 - sensitivity
- ____ 9. An increase in neural activity leads to a local
- decrease in blood oxygenation.
 - increase in receptive field size.
 - increase in blood oxygenation.
 - decrease in receptive field size.
- ____ 10. Which of the following is **not** evidence of orientation selective cells?
- the tilt aftereffect
 - orientation selective adaptation
 - the tilt illusion
 - the Hermann grid illusion
- ____ 11. The cortical magnification factor occurs in humans because
- a small area in the fovea accounts for a large area on the cortex.
 - the lens accommodates so that the image is focused on the retina.
 - the area of the optic disk accounts for a large area on the cortex.
 - a small area in the peripheral retina accounts for a large area on the cortex.
- ____ 12. The radio station KEXP in Seattle cannot be detected by our visual system because
- visible light adapts the radio waves emitted by the broadcast tower.
 - light and radio signals are unrelated phenomena.
 - we do not know what music would look like.
 - radio waves have much longer wavelengths than visible light.
- ____ 13. Visual information from the left _____ travels to the _____ hemisphere of the brain
- left eye; right
 - left half of the visual field; right
 - left half of the visual field; left
 - left eye; left
- ____ 14. In which psychophysical method does the experimenter select several stimuli in the vicinity of threshold and present them in random order?
- magnitude estimation
 - method of constant magnitude
 - method of limits
 - method of constant stimuli
 - method of adjustment
- ____ 15. What is the range of wavelengths that we perceive as light?
- 400-700 nanometers
 - 400-700 millimeters
 - 400-700 micrometers
 - 400-700 speedometers
 - 400-700 meters
- ____ 16. Presbyopia
- is due to a decreased ability to accommodate.
 - is caused by the cornea becoming non-spherical.
 - is due to a decreased ability to adapt.
 - causes the farthest distance at which one can see to move out.
- ____ 17. The contrast sensitivity function shows that normal observers are most sensitive to
- high spatial frequencies.
 - middle spatial frequencies.
 - high and low spatial frequencies.
 - low spatial frequencies.

- ___ 18. The receptive field of a neuron in the visual system is
- the set of neurons connected to its dendrites.
 - shaped like a giant cone.
 - the cell body.
 - the set of post-synaptic neurons.
 - the region of the visual field in which stimulation affects the cell's response.
- ___ 19. People with a _____ primary visual cortex are more likely to have _____ visual acuity thresholds.
- large; small
 - large; high
 - retinotopic; oriented
 - oriented; normal
- ___ 20. Most light entering the eye is
- reflected off of the cornea.
 - adapted.
 - reflected off of something.
 - coming directly from a light source.
- ___ 21. If you penetrate an electrode vertically down through the LGN, you'll find evidence of
- a retinotopic map.
 - cortical magnification.
 - eye-dominance, magnocellular and parvocellular layers.
 - bias in orientation selectivity toward vertical and horizontal.
- ___ 22. Which of the following brain imaging technique has the best spatial resolution?
- BLT
 - EEG
 - fMRI
 - TMS
- ___ 23. In the simultaneous contrast illusion, gray squares of equal intensities are surrounded by either a dark background or lighter background. The square on the dark background looks _____ the square on the lighter background.
- more colorful than
 - darker than
 - the same as
 - lighter than
- ___ 24. Retinotopic maps can be found
- in the Geology department.
 - in the LGN but not in V1.
 - in V1 but not in the LGN.
 - both in the LGN and in V1.
- ___ 25. Hubel and Wiesel first measured orientation selectivity
- in the LGN of the cat.
 - in the primary visual cortex of the monkey.
 - in the primary visual cortex of the cat.
 - in the LGN of the monkey.
- ___ 26. After being exposed to light, a dissected frog retina becomes _____ over time.
- faster
 - more responsive
 - lighter
 - darker
- ___ 27. The blind spot
- is in the fovea.
 - is most common in older individuals.
 - is caused by elevated pressure in the eye.
 - is caused by the optic nerve leaving the eye.
- ___ 28. When you focus from a far distance to an object up close, the ciliary muscles _____ which causes the lens to _____.
- tighten; become thinner
 - relax; thicken
 - tighten; thicken
 - relax; become thinner

- _____ 29. As you move from the fovea to the periphery, the number of rods per square millimeter _____.
a. decreases and then increases c. increases
b. increases and then decreases d. decreases
- _____ 30. Between a dark night and a bright day, light levels range over ____ orders of magnitude.
In a given lighting condition, light ranges over about _____ orders of magnitude.
a. 2; 2 c. 9; 2
b. 2; 9 d. 9; 9
- _____ 31. Which of the following is NOT a way the visual system deals with a broad range of light levels.
a. Having rods for night vision, cones for day vision
b. Pupil dialation
c. Accomodation of the lens
d. Adaptation of photoreceptors
- _____ 32. True or false: sensory action potentials can occur in the absence of a physical stimulus:
a. True
b. False
- _____ 33. Which is an example of the 'oblique effect'?
a. The rods are most sensitive at night.
b. The visual system is more sensitive to vertical and horizontal orientations than to oblique orientations.
c. The visual system is more sensitive in the fovea than the periphery.
d. Lines do not look parallel in the Cafe' wall illusion.
- _____ 34. If you record from neurons with an electrode as it penetrates straight down into the cortex (perpendicular to the surface), neurons will
a. have receptive fields at roughly the same location.
b. have preferred orientations that change systematically.
c. change from rod to cone vision.
d. have preferred ocular dominance that alternates from eye to eye

Name: _____

ID: B

Short Answer (3 points each)

35. What is it about the retina of the Octopus that makes it unnecessary for it to have a blind spot?

36. Describe Hubel and Wiesel's 'Cube Model' of the primary visual cortex. Draw a diagram if it helps.

Name: _____

ID: B

37. Plot your estimate of the amount of orientation content present in the image below. You may plot it as a Cartesian graph (with orientation on the x-axis), or as a polar plot as shown in lecture.



**Psych 333, Winter 2008, Instructor Boynton, Exam 1
Answer Section**

MULTIPLE CHOICE

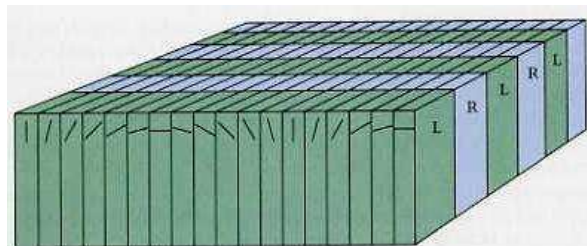
1. ANS: B
2. ANS: B
3. ANS: B
4. ANS: C
5. ANS: D
6. ANS: A
7. ANS: A
8. ANS: C
9. ANS: C
10. ANS: D
11. ANS: A
12. ANS: D
13. ANS: B
14. ANS: D
15. ANS: A
16. ANS: A
17. ANS: B
18. ANS: E
19. ANS: A
20. ANS: C
21. ANS: C
22. ANS: C
23. ANS: D
24. ANS: D
25. ANS: C
26. ANS: C
27. ANS: D
28. ANS: C
29. ANS: B
30. ANS: C
31. ANS: C
32. ANS: A
33. ANS: B
34. ANS: A

SHORT ANSWER

35. ANS:

Our photoreceptors point away from the light and lie in the back of the retina. We have a blind spot at the optic disc where the nerve fibers leave the eye because there is no room for photoreceptors there. Photoreceptors in the Octopus retina point toward the light away from the back of the retina, so there is room for them on top of the optic disc.

36. ANS:



Orientation columns in one dimension, ocular dominance columns in the other.

37. ANS:

