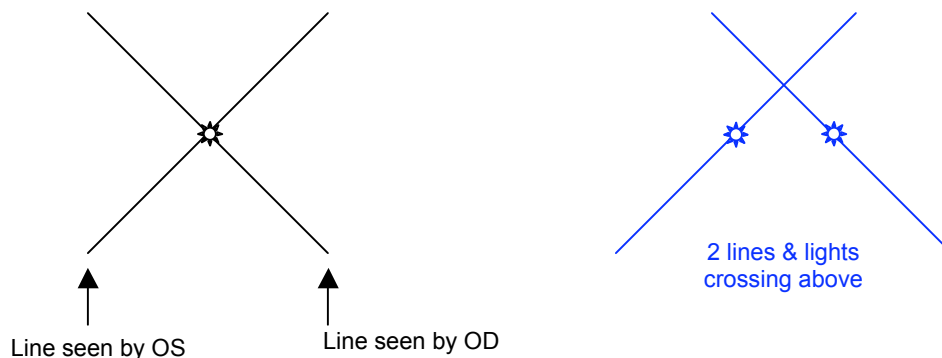


## Vision Science III – Binocular Vision Exam 2

May 5, 2005

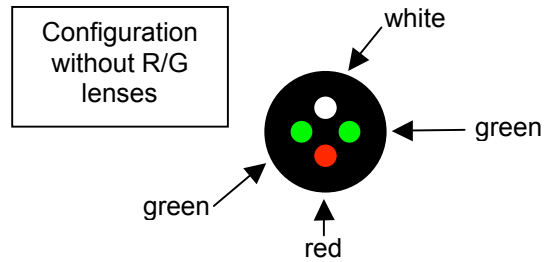
(Total points = 42)

- Which of the following best describes diplopia?
  - One object seen in the same oculocentric direction by each eye
  - One object seen in different oculocentric directions by the two eyes
  - Two objects with different positions seen in the same oculocentric direction by each eye
  - Two objects with different positions seen in different oculocentric directions by the two eyes
  - Both a and d
- Which of the following best describes confusion?
  - One object seen in the same oculocentric direction by each eye
  - One object seen in different oculocentric directions by the two eyes
  - Two objects with different positions seen in the same oculocentric direction by each eye
  - Two objects with different positions seen in different oculocentric directions by the two eyes
  - Both a and d
- Which of the following best describes binocular fusion?
  - One object seen in the same oculocentric direction by each eye
  - One object seen in different oculocentric directions by the two eyes
  - Two objects with different positions seen in the same oculocentric direction by each eye
  - Two objects with different positions seen in different oculocentric directions by the two eyes
  - Both a and d
- Which of the following lists the most logical sequence for the development of conditions following an acute extraocular muscle paresis? That is, which would lead to the next, in order.
  - Rivalry; diplopia and confusion; uncorrelated images; suppression
  - Rivalry; diplopia; uncorrelated images; suppression; confusion
  - Suppression; rivalry; uncorrelated images; diplopia and confusion
  - Uncorrelated images; diplopia and confusion; rivalry; suppression
- Which of the following does NOT correctly describe a basic principle of suppression?
  - An image with low spatial frequencies tends to suppress an image with high spatial frequencies.
  - A moving image tends to suppress a stationary image.
  - A high contrast image tends to suppress a low contrast image.
  - Contours tend to suppress homogenous fields.
  - Foveal images tend to suppress peripheral images.
- Bagolini lenses are oriented so that a person with normal binocular fusion sees a pattern like that shown below. Note which eye sees which part. Draw a picture to show what a patient with esotropia should see if he does not suppress and has normal correspondence. (2)



7. When doing a Worth-4-dot test (figure), with the red lens over OD and green lens over OS, the patient sees four dots. What is the diagnosis and what color would each of the dots be? (3)

binocular fusion  
two green, one red  
(the other seen red-green color fused)



8. Which of the following prismatic corrections would most likely make a patient feel that he is taller than normal?

- a. Base-up yoked prism
- b. Base-down yoked prism
- c. Base-in prism OU
- d. Base-out prism OU

9. Which of the following best describes the situation you would expect for a patient with 3 diopters of spherical anisometropia?

- a. He will have aniseikonia due to the difference in spectacle magnification between the eyes.
- b. He will have aniseikonia only when corrected by spectacles and if the eyes have the same axial length.
- c. He will have aniseikonia due to the combined geometric and induced effects.
- d. He will have aniseikonia if the spectacle magnification is not offset by the eye's optics, local-sign symmetry and neurological factors.

10. How will a wall in front of a patient appear if he has aniseikonia caused by the following spectacle Rx?

OD -1.00 -2.00 x 180  
OS -3.00 sphere

- a. Trapezoid base left and the right side will appear farther away
- b. Trapezoid base right and the right side will appear farther away
- c. Trapezoid base right and the left side will appear farther away
- d. Trapezoid base left and the left side will appear farther away

11. How will a wall in front of a patient appear if he has aniseikonia caused by the following spectacle Rx?

OD -2.00 sphere  
OS plano -2.00 x 090

- a. Trapezoid base left and the right side will appear farther away
- b. Trapezoid base right and the right side will appear farther away
- c. Trapezoid base right and the left side will appear farther away
- d. Trapezoid base left and the left side will appear farther away

12. How will a wall in front of a patient appear if he has aniseikonia due to the following spectacle Rx?

OD            -2.00 -3.00 x 045  
OS            -2.00 -3.00 x 135

- a. Trapezoid base up, top side closer
- b. Trapezoid base up, bottom side closer
- c. Trapezoid base down, top side closer
- d. Trapezoid base down, bottom side closer

13. When testing a patient with an eikonometer, the vertical lines appear parallel to the fronto-parallel plane, and the cross appears tilted farther away on the left side. The person has greater

- a. horizontal mag OD (axis 090).
- b. horizontal mag OS (axis 090).
- c. vertical mag OD (axis 180).
- d. vertical mag OS (axis 180).
- e. overall mag OD.
- f. overall mag OS.

14. When testing a patient with an eikonometer, the vertical lines and the cross appear tilted away from OD. The person has greater

- a. horizontal mag OD (axis 090).
- b. horizontal mag OS (axis 090).
- c. vertical mag OD (axis 180).
- d. vertical mag OS (axis 180).
- e. overall mag OD.
- f. overall mag OS.

15. When testing a patient with an eikonometer, the cross appears parallel to the fronto-parallel plane, and the vertical lines appear tilted farther away on the left side. The person has greater

- a. horizontal mag OD (axis 090)
- b. horizontal mag OS (axis 090)
- c. vertical mag OD (axis 180)
- d. vertical mag OS (axis 180)
- e. overall mag OD
- f. overall mag OS

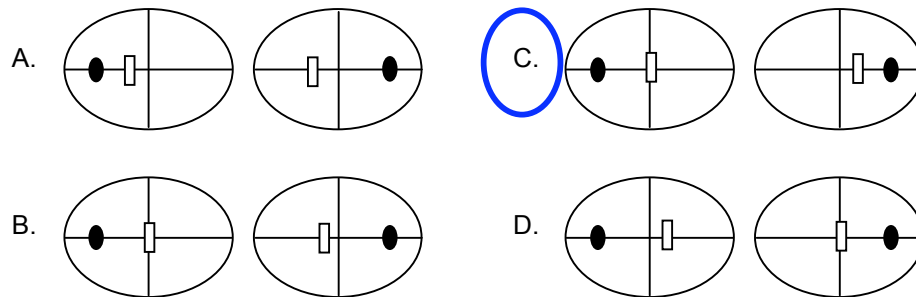
16. At which level in the visual pathways do you first encounter binocular neurons in the normal adult?

- a. optic chiasm
- b. LGN
- c. first-order neuron in area V1
- d. second-order neuron in area V1
- e. first-order neuron in area V2

17. Which of the following is NOT processed by neurons in the parvocellular pathway?

- a. course-motion stereopsis
- b. fine-static stereopsis
- c. color perception
- d. high spatial frequencies

18. Which of the following receptive fields most likely corresponds with a binocular neuron tuned for uncrossed disparity? In each, the black oval represents the blind spot and the white rectangles represent the location of the receptive field in each eye's monocular visual field.



19. LGN neuron receptive fields are circular and show spatial antagonism. Scientists hypothesize that LGN neurons with adjacent receptive fields arranged in a straight line probably synapse with a simple cell in the primary visual cortex whose receptive field closely matches the summed LGN fields. This is an example of ...

- bottom-down processing.
- hierarchal processing.
- correlative dominance.
- parallel processing.

20. Which of the following is NOT a technique that has been used to study stereopsis in infants?

- visual cliff
- random-dot preferential looking charts
- VER
- Pulfrich effect

21. Which of the following best describes the development of normal binocular fusion in humans?

- It includes a critical period beginning from about 2 months of age, followed by rapid development within the first year.
- It includes a critical period beginning at birth, followed by rapid development until age 1.
- It closely parallels the development of visual acuity from birth to maturity at 8-9 years of age.
- It includes a critical period with rapid development from birth to maturity at about 2 months of age.

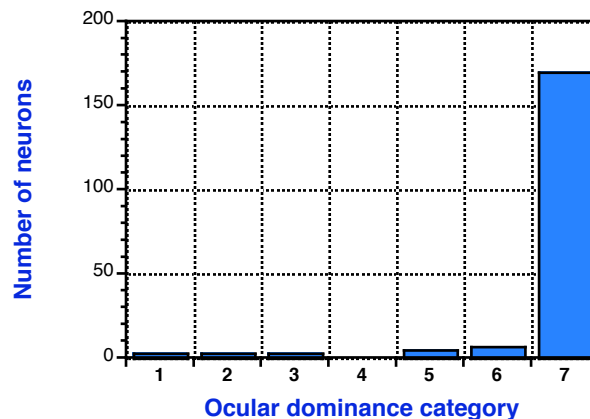
22. A mother brings her 3-month-old baby to your office because she is concerned that her eyes seem to occasionally turn outward. You diagnose an intermittent exotropia. If the condition is not treated, in the majority of cases this will lead to ...

- permanent alternating exotropia, but normal visual acuity it each eye.
- permanent exotropia with amblyopia in the non-dominant eye.
- alternating amblyopia.
- normal ocular alignment and normal binocular development within a few months.

23. Which of the following best describes the development of stereopsis in humans?

- It shows a rapid burst of development from no stereopsis to nearly full stereopsis between about 3 to 5 months of age.
- It precedes the development of accurate eye movements and motion perception.
- It follows the same time course and pace of development as visual acuity and contrast sensitivity.
- Boys tend to develop stereopsis about 1 month before of girls, but girls soon catch up.

24. Most first-order neurons in the primary visual cortex are ...
- monocular at birth, but become binocular within the first few months.
  - monocular from birth and through the rest of life.
  - binocular at birth, but become monocular as the visual system matures.
  - binocular from birth and through the rest of life.
25. Monocular deprivation is most damaging to the development of visual acuity if it occurs ...
- prior to the critical period.
  - within the first six months of the critical period.
  - within the last six months of the critical period.
  - during the first six months after completion of the critical period.
26. To receive the maximum benefit from reverse occlusion for amblyopia, it should be started ...
- and completed prior to the beginning of the critical period.
  - early in the critical period.
  - near the end of the critical period.
  - at any time, as long as it is applied full time.
27. Based on the principles discovered by Hubel and Wiesel in their research with kittens, which of the following conditions would best account for the ocular dominance histogram shown below?
- Constant monocular deprivation during the critical period
  - Alternating monocular deprivation during the critical period
  - Constant monocular deprivation for one month following the critical period
  - Constant binocular deprivation for one month following the critical period



28. Which of the following conditions, if left uncorrected, would most likely cause abnormal development of neurons in the visual cortex associated with the magnocellular pathways?
- Alternating exotropia
  - Accommodative esotropia
  - Congenital cataract
  - 3.00 diopters of bilateral myopia
29. Which of the following is the most important initial treatment for refractive esotropia?
- Surgery
  - Spectacles (sphere and cylinder)
  - Occlusion
  - Prism
  - Vision therapy (eye exercises)

30. If a baby is born with a dense congenital cataract, when should you refer him for cataract surgery?

- a. As soon as possible.
- b. At about 6 months of age.
- c. Between 6 months and 1 year of age.
- d. After 1 year of age.

31. 3-D movies create a compelling illusion of three-dimensional depth using red/green glasses to make the right and left eyes see slightly disparate images. If the movie shows a natural scene, what will happen if the person accidentally wears his glasses with the red and green filters over the wrong eyes?

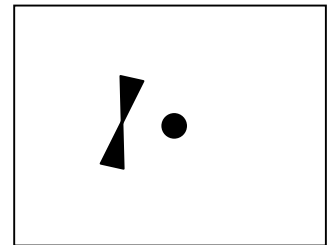
- a. All depths will be reversed since the disparities will be reversed.
- b. The scene will appear flat since depth perception will be lost.
- c. Depth will be reduced but not completely eliminated.
- d. The sense of stereoscopic depth will be increased due to hyperstereopsis.

32. Which of the following best describes microstrabismus, also known as monofixation syndrome?

- a. It must usually be corrected surgically.
- b. It is a common cause of eyestrain and headaches.
- c. It severely disrupts binocular vision, preventing both central or peripheral binocular fusion.
- d. It is a small residual deviation following strabismus surgery.

33. If a patient (viewing with OD; OS occluded) attempts to fixate the center dot, but sees Haidinger's Brushes to the left, as shown in the figure, what condition do he have?

- a. Nasal eccentric fixation in OD
- b. Temporal eccentric fixation in OD
- c. Normal fixation in OD
- d. Anomalous correspondence



34. By prism neutralization and the cover test, you determine that a patient has 7 prism diopters of esotropia OS. He is able to fuse, and subjectively shows zero deviation by the von Graefe test. Which of the following conditions does he have?

- a. Eccentric fixation
- b. Harmonious anomalous correspondence
- c. Unharmonious anomalous correspondence
- d. Normal correspondence

35. While stopped in traffic, you suddenly sense that your car is moving due to the movement of cars in the adjacent lanes, even though you are not actually moving. This is an example of ...

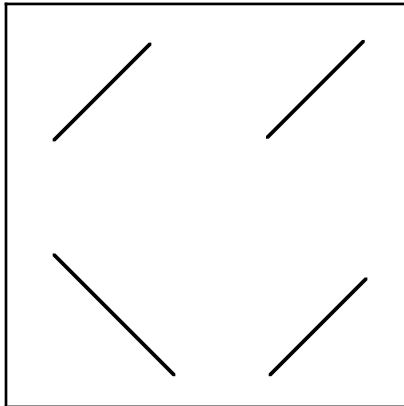
- a. biological motion.
- b. the induced effect.
- c. autokinesis.
- d. self motion

36. If you watch a small illuminated ball suspended from the ceiling in a dark room, it may appear to move about on its own. This is an example of ...

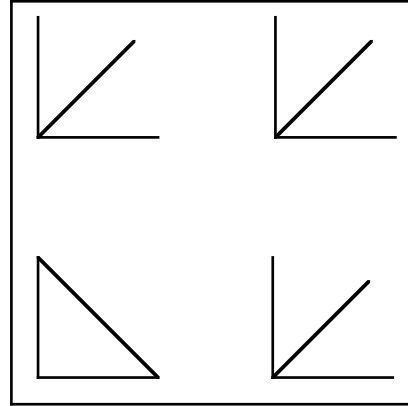
- a. biological motion.
- b. the induced effect.
- c. autokinesis.
- d. self motion.

37. The figure below shows two targets used in an experiment to study visual processing. If the visual system does NOT use Gestalt (top-down) processing, but instead uses bottom-up processing, you would expect that the subject would ...

- a. recognize the odd figure in Frame b faster than in Frame a.
- b. not recognize the odd figure in Frame b faster than in Frame a.
- c. be incapable of recognizing the odd figure in either frame.
- d. recognize the odd figure equally well on either frame because it's on the bottom.



a



b

38. Most people have difficulty seeing both the aqueduct and ships at the same time in the figure below. This due to the way our visual system processes ...

- a. images according to the geometric effect.
- b. agnosias.
- c. figure and ground.
- d. high spatial frequencies.



39. Based on Teller's rule of thumb, what visual acuity should you expect for a 6-month old baby?

- a. 20/20
- b. 20/60
- c. 20/100
- d. 20/600