

Exam 2

5/4/07

(36 questions + one bonus)

Name or PIN _____

1. When viewing near objects, binocular parallax can cause OD and OS to see different images. The dissimilar images can lead to a situation described as “a competition or antagonism; a vying for supremacy”* between the two eyes. Which of the following best describes this situation?

- a. crossed dominance
- b. suppression
- c. correlation
- d. rivalry

(* From the Dictionary of Visual Science, 4th Edition)

2. Which of the following best describes binocular confusion?

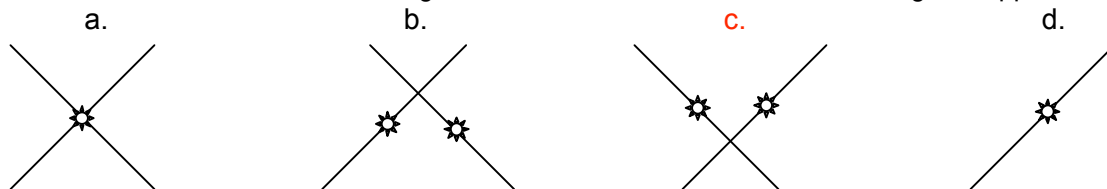
- a. Images of a single object on both the OD and OS foveas at the same time.
- b. Images of a single object on the OD fovea and OS periphery at the same time.
- c. Two objects that appear to be in the same egocentric visual direction at the same time.
- d. Two objects that appear to be in different egocentric visual directions at the same time.

3. The term “suppression” includes which of the following?

- a. The full visual field is seen by one eye but not the other.
- b. Part of the mid-peripheral visual field of one eye is not seen.
- c. The central field of only one eye is seen but the periphery is fused.
- d. All of the above can occur with suppression.

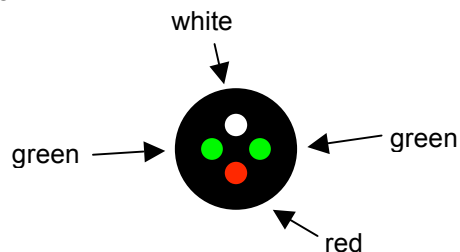


4. When viewing a point of light through Bagolini lenses each eye will see a bright line oriented perpendicular to the striations etched in the lens. If an exotropic patient is wearing Bagolini lenses with the striations oriented as shown in the figure above, what should he see, assuming no suppression?



5. When doing a Worth-4-dot test (see figure below), with the red lens over OD and green lens over OS, the patient sees three dots. What is the diagnosis?

- a. suppression OD
- b. suppression OS
- c. diplopia OU
- d. binocular fusion



6. Which of the following lists the most logical sequence of conditions following an acute extraocular muscle palsy? That is, which one would lead to the next, in order.
- rivalry; diplopia and confusion; uncorrelated images; suppression
 - uncorrelated images; diplopia and confusion; rivalry; suppression
 - rivalry; diplopia; uncorrelated images; suppression; confusion
 - suppression; rivalry; uncorrelated images; diplopia and confusion

7. Which of the following best describes what a patient with 2 diopters of spherical anisometropia will perceive?

- About 2% aniseikonia with spectacles
- About 2% aniseikonia with contact lenses
- About 2% aniseikonia when uncorrected
- It can vary depending on other factors besides the spectacle prescription.

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

OD -2.00 sph
OS plano -2.00 x 090

- closer to OD and smaller on that side
- closer to OD and larger on that side
- closer to OS and smaller on that side
- closer to OS and larger on that side

9. If the person in Question 8 looked into an Eikonometer, with all its settings in the zero position, what should he see?

- The vertical lines and the cross should appear closer to OS.
- The cross, but not the vertical lines, should appear closer to OS.
- The vertical lines and the cross should appear closer to OD.
- The vertical lines, but not the cross, should appear closer to OS.

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

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

- closer and smaller at the top
- farther and smaller at the top
- farther and larger at the top
- closer and larger at the top

11. If the person in Question 10 looked into an Eikonometer, with all its settings in the zero position, what should he see?

- The cross should be narrower and tilted toward the person at the top.
- The cross should be narrower and tilted toward the person at the bottom.
- The cross should be wider and tilted toward the person at the top.
- The cross should be wider and tilted toward the person at the bottom.

12. 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. closer to OD and smaller on that side
- b. closer to OD and larger on that side
- c. closer to OS and smaller on that side
- d. closer to OS and larger on that side

13. If the person in Question 12 looked into an Eikonometer, with all its settings in the zero position, what should he see?

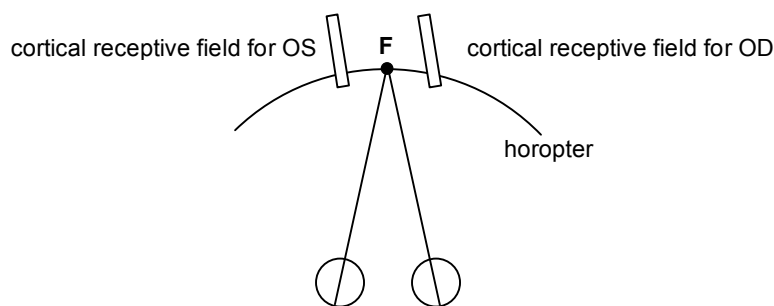
- a. The vertical lines and the cross should appear farther from OD.
- b. The vertical lines, but not the cross, should appear farther from OD.
- c. The cross, but not the vertical lines, should appear farther from OD.
- d. The vertical lines and the cross should appear farther from OS.

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

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

15. What are the ocular dominance columns?

- a. another name for the darkly staining "blob" regions in the primary visual cortex
- b. vertical slabs within Area V1 that are dominated by input from either OD or OS
- c. nuclei in the midbrain that determine ocular dominance
- d. narrow vertical strips used to block part of either eye's visual field and allow binocular refraction



16. The figure above, similar to Schwartz Fig. 14-10, shows the location of receptive fields for a cortical neuron that receives input from both OD and OS. Which of the following best describes this neuron?

- a. It is tuned to detect visual confusion since the receptive fields are in different locations.
- b. It is tuned to respond most strongly to an object located nearer than the fixation point.
- c. It is tuned to detect diplopia since it has two receptive fields that are off the fixation point.
- d. It is tuned to respond most strongly to an object located beyond the fixation point.

17. Cortical simple cell receptive fields have which of the following characteristics?

- a. not circular but elongated
- b. respond best to edges or bars
- c. have a specific meridional orientation
- d. all of the above

18. What affect should complete decussation of nasal fibers, and non-decussation of temporal fibers, at the optic chiasm have on stereopsis?

- a. It would provide for exceptionally good stereopsis on the midline.
- b. It would make stereopsis impossible on the midline.
- c. It would make stereopsis impossible in the periphery.
- d. It would allow for some stereopsis in response to vertical disparities.

19. The figure to the right shows an example of a technique that has been used to investigate depth perception in infants. What is it called?

- a. preferential looking
- b. visually evoked response
- c. visual cliff
- d. biological motion



20. Which of the following would be considered most abnormal for the majority of 2-month old infants?

- a. intermittent exotropia
- b. absence of stereopsis
- c. jerky pursuits when following an object from nasal to temporal field
- d. constant esotropia

21. According to Held's two-stage model of binocular development, which of the following statements does not correctly describe normal binocular development in the visual cortex?

- a. At birth the first-order neurons in V1 are clearly delineated into OD- or OS-dominated regions, but as the system matures these neurons receive equal input from both eyes and become true binocular neurons.
- b. At birth there is considerable overlap of OD and OS input into the first-order V1 neurons, but over time they change to become dominated by either OD or OS.
- c. At birth, neurons in V1 layer IVC may be considered binocular, but with maturity these neurons become monocular.
- d. At birth, the second-order neurons in Area V1 destined to become binocular neurons do not receive distinct OD and OS inputs since OD and OS inputs are already combined in the first-order neuron.

22. Which of the following describes normal visual development?

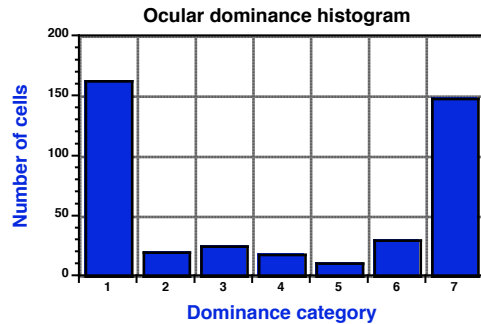
- a. development of monocular spatial vision from birth
- b. normal alignment and eye movements by 4 months
- c. stereopsis by 6 months
- d. 20/20 visual acuity by 30 months
- e. all of the above

23. When does the critical period for binocular fusion begin?

- a. at birth
- b. 2-3 months after birth
- c. at 6-9 months of age
- d. at 9-12 months of age

24. Which of the following would be the single most effective treatment for a child with accommodative esotropia?

- strabismus surgery before the age of 1 year
- correction of a hyperopic refractive error
- full time direct occlusion
- vision therapy before the age of 1 year



25. Which of the following most likely caused the ocular dominance histogram shown above?

- normal binocular development
- monocular deprivation during the critical period
- binocular deprivation during the critical period
- surgically-induced exotropia during the critical period

26. Among children 6-8 months of age, which of the following has the highest incidence?

- infantile esotropia
- refractive esotropia
- intermittent exotropia
- constant infantile exotropia

27. Which of the following factors contribute to a good prognosis for recovery of binocular vision in a child with intermittent exotropia?

- onset after the development of most binocular vision functions
- periods of binocular fusion between episodes of strabismus
- accommodative convergence that helps maintain ocular alignment at near
- all of the above

28. Patients with monofixation syndrome typically have

- normal binocular fusion and stereopsis.
- peripheral suppression.
- cosmetically aligned eyes.
- at least 20 prism diopters of strabismus.

29. Which of the following best describes eccentric fixation?

- an eye monocularly fixates using a non-foveal retinal point
- the subjective and objective angles of strabismus are equal
- the subjective and objective angles of strabismus are not equal
- erratic fixation by the fovea of either eye

30. If a patient has an after-image optically imprinted on the OD fovea, and has a nasal eccentric fixation in OS, when OD is covered, he should see ...
- a line to the left of the fixation point.
 - a line centered on the fixation point.
 - a line to the right of the fixation point.
 - the fixation point decentered nasally with no line since OD is covered.
31. If a patient shows a large esotropia by the cover test but is able to fuse and subjectively shows no esotropia, he probably has
- eccentric fixation.
 - alternating suppression.
 - harmonious anomalous correspondence.
 - unharmonious anomalous correspondence.
32. A patient with a large esotropia by the cover test is able to fuse but subjectively seems to have a smaller esotropia than you measured objectively. Which of the following conditions does this patient most likely have?
- eccentric fixation.
 - alternating suppression.
 - harmonious anomalous correspondence.
 - unharmonious anomalous correspondence.
33. Which of the following best summarizes top-down processing of visual information?
- The visual system Fourier analyzes images and reassembles the spatial frequencies in the brain.
 - The visual system interprets and organizes incoming data to fit into a preconceived image.
 - Active image processing doesn't begin until the second synapse in the primary visual cortex.
 - Stereopsis will override monocular depth cues if there is a conflict.
34. When watching a small point source in a dark room you may notice a phenomenon known as autokinesis. What happens?
- The light appears to get closer to you.
 - The light appears to get brighter.
 - The light begins to fade from view.
 - The light appears to shift its position.
35. Which of the following best accounts for this phenomenon?
- Stiles-Crawford effect
 - Pulfrich phenomenon
 - Fechner's paradox
 - involuntary eye movements
36. If a stationary dot is located in the center of a frame, and the frame is moved slowly to the right, the dot will appear to
- remain in the same location.
 - move slowly to the right.
 - move slowly to the left.
 - move in an elliptical pattern.
- BONUS!** Which of the following activities will you most likely do this coming weekend?
- Have lunch with Drs. Hubel and Wiesel
 - Create a podcast of your favorite vision science lecture
 - Build your own Howard-Dohman apparatus
 - None of the above

Thank you for your hard work and dedication. It's been a blessing to know you. Have a nice break! – Dr. Salmon