

*Opto 328- Physiology of Vision
Final Exam Study Guide*

- *All material is included in the final exam.*
- *After you study, make sure you know and understand the following points.*

1. Retinal layers and organization.
 2. The relationship between photoreceptors and the cells in the other layers , the convergence (Ex: 1:1 in the center).
 3. What happen to ganglion cells with eccentricity?
 4. Parts of photoreceptor and function of each part?
 5. Types of pigments in retina (for rods and cones)
 6. Photopigment components.
 7. How the components differ in each photopigment.
 8. Terms in the first slide of lecture 3 are very important.
 9. Classes of synapses.
 10. Which cells are capable of generating Action potential and which cells are capable of generating graded potential?
 11. Cones circuit of the retina, sign conserving and sign inverting pathway.
 12. Rod circuit of the retina, and the role of Amacrine cell II.
 13. The type of synapses between Amacrine II and cone ON and OFF bipolar.
 14. Excitatory and inhibitory Neurotransmitter.
 15. What is photoisomerization?
 16. How many photons are needed for the rod to response, and how many are required for the visual system to respond?
 17. Production and Turnover of Outer Segment Disc Lamellae.
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18. (Horizontal, Bipolar, and Gc)Function, Types, and How it response to light, NT
 19. Center-surround organization of the receptive field (benefit? From where?)
 20. Color opponency at the level of ganglion cells.
 21. Absolute threshold and how to measure it.
 22. Dark adaptation curve.
 23. The Differential Threshold, JND, Weber law.
 24. Principle of Univariance.
 25. Young-Helmholtz Trichromatic color theory.

26. The difference between one, two, and three photoreceptor retina.
 27. Additive and subtractive color?
 28. Color opponent theory.
 29. Arrangement of hues in the visible spectrum.
 30. Complementary Hues.
 31. Chromaticity Chart principle.
 32. Resolving power of the eye, MAR, and VA.
 33. What is spatial resolution? Nyquist limit?
 34. Helmholtz sampling theory.
 35. Aliasing (Def, when and where it occurs, how it is perceived).
 36. Def of spatial and temporal induction.
 37. 4 methods to test VA.
 38. How to calculate MAR from Snellen fraction.
 39. Hyperacuity.
 40. PSF and how to calculate the minimum separation.
 41. How GC response to different position of light.
 42. Ricco's and Piper's Laws.
 43. Visual persistence and CFF
 44. Bloch's Law, Temporal Vision Laws
 45. Response to invisible and very low flicker
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46. ERG (what it measures? Each wave reflects activity of which neurons in Scotopic and photopic conditions)?
47. How to measure electrical activity of 3rd order neuron and RPE?
48. How to isolate rod and cone response?
49. Origin of VEP.
50. Reasons for a predominant contribution of the central visual field to the VEP.
51. Clinical uses of the VEP.
52. The reasons for VEP complexity and how to solve this problem.
53. Electrode position.
54. VEP types.
55. Normal implicit time.
56. Possible reasons for VEP delay.
57. Contrast & Importance of fovea in VEP.
58. Diseases: clinical characteristics, cause, defective gene, and where is the problem.

*Good Luck
Shatha*

