

Study Guide for the first examination (Thursday, 9 October 2003). Be able to answer the following questions and be familiar with the concepts involved in the answers.

1. Be able to describe the three psychophysical methods developed by G. T. Fechner and first published in his book *Elements of Psychophysics* in 1860. Which method did you use in the weight discrimination lab?
2. Describe the receiver operating characteristic (ROC). What is the ROC predicted by the high threshold model of signal detection and what is the ROC predicted by the dual-Gaussian, variable-criterion signal detection model? Evaluate the evidence favoring one model over the other.
3. Be able to locate and label the following structures in the eye: cornea, lens, pupil, iris, sclera, aqueous humor, vitreous humor, retina, optic disk and optic nerve.
4. Be able to draw and label a diagram of the retina including the following parts: rods, cones, receptor outer segments, receptor inner segments, horizontal cells, bipolar cells, amacrine cells, ganglion cells and the optic nerve.
5. Draw a diagram of the major neural pathways from the retina to cerebral cortex.
6. Define the term “receptive field.” Describe the receptive fields of retinal ganglion cells and be able to compare and contrast them with receptive fields of cortical cells in the primary visual cortex.
7. Explain how Mach Bands or the illusory dots of the Hermann Grid are created using the properties of ganglion cell receptive fields.
8. Why do dark-adaptation curves and the Purkinje shift indicate that there are two receptor systems in our retina?
9. In terms of relative optical power (dioptries) what are the near point and far point? What happens to the eye in presbyopia? What happens to the far point in myopia and hyperopia?
10. Why do we need artificial illumination at the end of civil twilight in order to perform many visual tasks?
11. How does the sensitivity of the visual system differ for sine and square waves? Why? What information do high spatial frequencies carry? Low spatial frequencies?
12. How does an infant’s contrast sensitivity function compare with an adult’s? Draw them on the same graph.