

Study Guide for the first examination (Monday, 4 March 2013, 11:00–11:50). Be able to answer the following questions and be familiar with the concepts involved in the answers. Review your homework and lab assignments and be familiar with the concepts included in them as well.

1. Using the concepts in Lab 1, draw a psychometric function illustrating discriminating dimmer and brighter lights from a standard light. Be sure to label the axes. Indicate on the graph how the discrimination “threshold” is defined.
2. Using the concepts in Lab 2, illustrate a dual-Gaussian signal detection model describing recognition memory performance for familiar faces (s_1) and unfamiliar faces (s_0). Let s_0 have a mean of 0.0 and a standard deviation of 1.0. Let the distance between the two means be 1.5 standard deviation units. In the illustration draw two response criteria that create three response categories corresponding to your confidence that you have seen each face before: “no,” “not sure” and “yes.”
3. Using the concepts in Lab 3, discuss the evidence supporting the existence of opponent-process color mechanisms. Describe their characteristics and present two perceptual phenomena that can be explained by them. Be prepared to describe the color experience an observer will have if you know the activity of the rg and of the y_b channels;
4. Define hit rate and false alarm rate. Describe the receiver operating characteristic (ROC) predicted by the High Threshold Model and by the Signal Detection Theory of detection. Memorize the formula for computing sensitivity (d') from the hit rate and the false alarm rate for the equal-variance dual-Gaussian signal detection model.
5. Draw a diagram of the eye including the following structures: cornea, lens, pupil, iris, sclera, aqueous humor, vitreous humor, choroid, retina, fovea, optic disk and optic nerve.
6. If an object appears in the lower right part of your visual field, what part of the primary visual cortex will be processing the object information?
7. Offer an explanation of the Hermann Grid phenomenon based on ganglion cell receptive field characteristics. Why is this explanation insufficient?
8. Discuss the evidence that our color vision is based on three different types of cone receptors.
9. What happens to contrast sensitivity and visual acuity as illumination goes down? Why is 3.2 Lux, the illumination level at the end of civil twilight, used as a rule-of-thumb reference level for the lower limit of visual performance?
10. Describe the “size/distance” (size constancy) hypothesis of certain visual illusions. Pick two such illusions and explain them in terms of this hypothesis.
11. Describe three monocular depth cues. Give a real-world example of each.
12. What could you do to enhance the impression of depth in a photograph or painting while you are viewing it? What are the basic principles?
13. Give two examples in normal, healthy individuals of psychological phenomena caused by difficulties in paying attention.