Essay Questions for Exam 1

One of the following essay questions will appear on the first exam. Do not ask me to answer the questions for you.

Possible questions from chapter 1:

1. A researcher determined that people can just taste 1 mg of a substance dissolved in 1000 mg of pure water. The researcher also determined that people can just distinguish the difference between 1 mg of the substance in 1000 mg of pure water and 2 mg of the substance dissolved in 1000 mg of pure water. Assuming that Fechner’s law is true, draw the psychophysical function on the following set of axes. Add numbers / values to the Y axis. Precisely plot at least 4 points on the graph. For at least two points, explain where their values came from.

![Psychophysical Function Graph](image)

2. A noisy factory needs to install a fire alarm. The loudness of the alarm needs to be three JNDs above the noise level of the factory. Describe how you would use the method of constant stimuli to determine how loud the alarm should be.

Possible questions from chapter 2:

1. The remains of an animal previously unknown to science were found. The following were observed about its visual system:
   a. The eyes faced more to the sides of its head than facing forward.
   b. The animal had only one type of photoreceptor.
   c. The convergence rate was uniformly high throughout the retina.

What can you predict about the animal’s vision and lifestyle based on these observations? Explain your predictions.
2. A ganzfeld is a uniform visual field - the visual field is completely devoid of lines and edges (that is a hint.) If a person stares (no blinking - blinking would create an edge as the eyelids move across the visual field) at a uniformly colored ganzfeld, the color will slowly fade away over the course of 30 to 60 seconds leaving a person with the perception of a uniform gray visual field. Using what you know about retinal ganglion cells, explain why the color fades away.

Possible questions from chapter 3:

1. Describe an example that shows that the response of individual neurons in the visual system is inherently ambiguous. For your example, explain how the visual system removes the ambiguity in the response.
2. Discuss an example of the visual system decomposing the visual world into component parts. Why has the visual system evolved to process the individual components independently rather than processing the visual stimulus as a whole?

Possible questions from chapter 4:

1. The following picture (from <http://www.positiveflower.com/hidden-in-the-nature/> shows a camouflaged animal (an owl in a hole in a tree):

Based on at least one of the fundamental steps of object recognition, discuss why camouflage can be effective at disrupting object recognition.
2. Describe an agnosia. Discuss what agnosias tell us about modular versus distributed coding and why they tell us that.