

PSYC202-005 — Sample Midterm Questions — February, 2002

The following questions have been provided as examples of those that *may or may not* appear on the actual midterm exam – which will be held Thursday February 28, 2002 in Angus 104. In addition to these questions, material covered in *lecture, tutorial* and the *readings* may be included on the actual midterm. These are only sample questions that have been taken from past PSYC202 exams and may not completely reflect my own personal biases. At the midterm you not be allowed to use notes or books or other aids.

Obviously not all of these questions could be included on a fifty minute midterm, and possibly none of them will – but many students asked for a “sample midterm” and here it is. It is my hope that working through these questions will inspire you to study all of the course material, and ultimately understand it rather than just memorize it.

On Thursday February 14, in Angus 104 from 11:00-12:00 we will have a game of “Perception and Cognition Jeopardy”. All tutorial sections will participate, and assignment 5 will be submitted at the beginning of the session. Prizes will be awarded to the team with the most points.

Each multiple-choice question has one best answer.

- 1 The idea that perceived reality is a “construction of the brain” implies
 - a that no two people ever perceive the same reality
 - b that objective reality can never be experienced directly
 - c that perception is always false
 - d that perceptions and hallucinations cannot be distinguished

- 2 "Top-down" and "bottom-up" aspects of perception refer respectively to:
 - a conceptual knowledge: sensory processing
 - b sensory processing: conceptual knowledge
 - c upper visual field: lower visual field
 - d nurture: nature

- 3 The human brain contains many maps of the visual field. Which principle is followed in the maps representing form (shape) and color?
 - a the more important a function, the more neurons are devoted to it
 - b each portion of the visual field is represented equally among the neurons
 - c more neurons are devoted to peripheral vision than central vision
 - d form is a speciality of central vision, color is a speciality of peripheral vision

- 4 The region of the retina that is most densely packed with cones is the:
 - a optic disk
 - b blindspot
 - c foveal pit
 - d periphery

- 5 Which of the statements concerning dark adaptation is false?
- a rods and cones do not dark adapt in the same way
 - b after 30 minutes in the dark, cones are more sensitive to light than rods
 - c the dark adaptation function over time is really a combination of two processes
 - d complete dark adaptation takes around 30 minutes
- 6 Humans are most sensitive to the detection of motion in their:
- a central visual field
 - b peripheral visual field
 - c left visual field
 - d blind spot
- 7 The fact that the world appears to be standing still when we move our eyes indicates that there is communication between:
- a the two eyes
 - b the motion pathway and the form pathway
 - c the eye and the brain
 - d the image-retina and eye-head motion systems
- 8 If you wanted to create the illusion of movement in a human observer, when in fact there was no motion signal for the brain to use, which effect would you use?
- a McCollough effect
 - b autokinetic effect
 - c visible persistence
 - d apparent motion
- 9 Which of the following aspects of color science does not require an understanding of human physiology?
- a mixing lights of different colors
 - b detecting various forms of color blindness
 - c mixing pigments or paints of different colors
 - d three primary colors are needed to match a given spectral hue
- 10 When Gregory refers to a painting as having a "double reality," the two realities are:
- a the artist's intentions: what the viewer sees
 - b the model for the drawing: the drawing itself
 - c the neural representation at the eye and in the brain
 - d the flat surface of the canvas: the depicted depth in the picture
- 11 While reading this question, your eye movement are best described by the term
- a nystagmus
 - b tremor
 - c pursuit
 - d saccade

- 12 Stabilised retinal images help us to understand that visual neurons are designed to respond to
- a a stable world
 - b contours but not colors
 - c change
 - d colors but not contours
- 13 What materials do you need to create the autokinetic effect?
- a waterfall, stationary river bank
 - b candle, dark room
 - c shadow of an object on a screen in a dark room
 - d head movements with one eye closed
- 14 Induced movement can be seen when
- a a large object moves in the presence of a smaller stationary one
 - b a small object moves in the presence of a larger stationary one
 - c a candle glows in a dark room
 - d you first stare at a waterfall for a few minutes and then look away
- 15 Interposition or occlusion refers to
- a the blurring or blueness of distant objects.
 - b a near object obscuring one's view of a more distant object
 - c the difference in the content of the images in the two eyes
 - d opposite direction of apparent movement for near and far objects
- 16 A feature on a surface is bright on top and shadowed below. A light source is known to be shining down from above the scene. These properties are consistent with a
- a protrusion coming out toward the observer
 - b a dent into the surface
 - c a flaw or blemish in a flat surface
 - d either of two situations. Not enough information is given to be sure.
- 17 An art teacher tells you that to show depth you should draw near items larger and farther apart and far items smaller and closer together. She is referring to which depth cue?
- a interposition
 - b texture gradients
 - c compression
 - d the vanishing point

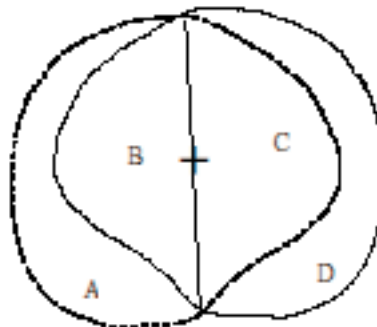
- 18 Evidence for movement specific neurons in the brain that is based entirely on human behavior and experience (not physiology or anatomy) comes from
- a measurements of parvo and magno ganglion cells
 - b studies of smooth pursuit eye movements
 - c studies of selective adaptation
 - d studies of induced motion
- 19 The perception of apparent movement between two stimuli in two different locations in space depends critically upon
- a the intensity of the stimuli
 - b the duration of the interval between stimulus onsets
 - c the duration of each stimulus presentation
 - d. the presence of dark stimuli on a light background
- 20 The ability to recognize that a pattern of moving points of light in the dark is actually a person you know is an example of
- a using visual motion for object identification
 - b how apparent motion can be used to fool the visual system
 - c the importance of optic flow
 - d induced motion
- 21 A fake smile looks different from a real smile because
- a the smiling motor neurons have been activated by different centers in each case
 - b the fake smile doesn't have real meaning
 - c the fake smile is generated by the basal ganglia
 - d the real smile is intended to look different by the wearer
- 22 The basic building block of the brain is the:
- a neurotransmitter
 - b dendrite
 - c synapse
 - d neuron
- 23 A neuron indicates the degree to which it has been stimulated by changing
- a its firing rate
 - b the amplitude of its action potential
 - c the transfer of ions across its membrane
 - d the duration of its refractory period
- 24 The "receptive field" describes the relation between _____ and _____.
- a center: surround
 - b retinal stimulation: neuron activity
 - c dendrite: axon
 - d nucleus: cell body

- 25 At night your eyes become less sensitive to
a red
b green
c blue
d violet
- 26 What is the main reason that we see the world in "taped delay?"
a the rapid speed of light and sound
b the sluggishness of neural transmission
c the lack of attention on the part of the observer
d surprisingly slow brain-muscle commands
- 27 If two images are flashed in quick succession, in the same place on the retina
a the first image will mask the visibility of the second image
b the second image will mask the visibility of the first image
c the two images will fuse through the action of visible persistence and be seen as one
d the first image will obliterate the second because of visible persistence
- 28 The threshold for detecting the presence of flicker in a light is called
a visible persistence
b temporal integration
c backward masking
d critical fusion frequency
- 29 For the purposes of human vision, color experience is best described as
a different wavelengths of light
b various hues arranged on a circle or wheel
c three dimensional: varying in hue, saturation, and brightness
d an infinity of gradations, ranging red to violet
- 30 Someone who is a dichromat cannot distinguish between some different
a hues when luminance has been equated
b luminance values when hues have been equated
c levels of saturation in the same hue
d objects, if they are too similar in hue but are different in luminance
- 31 Color constancy refers to the ability to accurately determine the color(s)
a of the light source
b reflected from the surface
c that reach the eye
d that are absorbed in the surface

- 32 A brain lesion can cause color blindness without any effect on the operation of the cones or primary visual cortex. This means that human color vision
- a can be accomplished without extra-striate cortical processing
 - b requires extra-striate cortical processing
 - c depends critically on the cones
 - d is different from form and motion perception
- 33 Neural signals
- a travel much more slowly in small fibres than large fibres
 - b travel much more slowly in large fibres than small fibres
 - c travel faster than electricity in a copper wire
 - d travel faster than the speed of light
- 34 The fact that light waves are bent when they travel through a medium that is denser than air is referred to as:
- a absorption
 - b reflection
 - c refraction
 - d vexation
- 35 Which is the most common colour of the pupil of the eye among humans?
- a brown
 - b blue
 - c green
 - d black
- 36 A researcher who believed our perceptual and cognitive abilities were developed via experience alone would be a:
- a empiricist
 - b Gibsonian
 - c monist
 - d structuralist
- 37 Charles Bonnet syndrome refers to:
- a the existence of a scotoma in the peripheral visual field
 - b failing to complete complex patterns across the blindspot
 - c seeing bizarre things that aren't really there
 - d making the head of someone disappear by using the blind spot
- 38 The region of the retina that is most densely packed with cones is the:
- a optic disk
 - b blindspot
 - c fovea
 - d periphery

- 39 Humans are most sensitive to colour in their:
- a central visual field
 - b peripheral visual field
 - c left visual field
 - d blind spot
- 40 The term “saturation” in colour perception refers to:
- a the relative activity of the red, green, and blue photoreceptors
 - b the hue of the perceived colour
 - c the purity of the perceived hue
 - d the maximum activity of the red, green, and blue photoreceptors
- 41 A specialized “arithmetic circuit” _____ exist in the brain, because _____.
- a does: there is evidence from stroke patients
 - b doesn't: there is no way a visual map would be needed
 - c does: each mental ability necessarily has a separate circuit
 - d doesn't: neurons can't represent abstract concepts
- 42 Evidence for movement specific neurons in the brain that is based entirely on human behavior and experience (not physiology or anatomy) comes from:
- a measurements of ganglion cells
 - b studies of smooth pursuit eye movements
 - c studies of selective adaptation
 - d studies of induced motion
- 43 The Behaviourist attitude to perception was that:
- a perceptual abilities were innate, and so could never change
 - b mental “atoms” were conceptual, but not perceptual
 - c perception had to be discussed only in terms of measurement
 - d conscious perception occurred only in “higher” animals
- 44 The Weber constant refers to:
- a sight
 - b hearing
 - c touch
 - d all of the above
- 45 What was the main problem with ecological optics?
- a it always assumed that consciousness was inaccessible
 - b it never specified what information was used for a perceptual process
 - c it never specified what computation was used for a perceptual process
 - d it always assumed that a perceptual hypothesis was possible

- 46 The basic unit that picks up light in the compound eye of insects is called:
- the ganglion cell
 - the ommatidium
 - the erythrochrome receptor
 - the optic chiasm
- 47 Joe can't tell green from gray. He has:
- chloranopia
 - deutanopia
 - tritanopia
 - protanopia
- 48 Information about light falling on the retina of the **left eye** initially goes to
- the left side of the brain.
 - the right side of the brain.
 - both the left and the right sides of the brain.
 - neither the left nor the right side of the brain.
- 49 Most ganglion cells have their cell bodies in the and their axon terminals in the
- lateral geniculate nucleus ... occipital lobe
 - retina ... lateral geniculate nucleus
 - superior colliculus ... lateral geniculate nucleus
 - superior colliculus ... parietal lobe
- 50 A man suffers a stroke that destroys most of his left thalamus, including all of the *left LGN*. Refer to the figure below, which marks the central fixation point and the visual fields of the left eye (dashed) and right eye (solid). When he is evaluated for visual deficits, it is likely that he
- can detect targets in Areas A and B but can not detect targets in areas C and D.
 - can detect targets in Areas B and C but can not detect targets in areas A and D.
 - can detect targets in areas B, C, and D but can not detect targets in area A.
 - can detect targets in Areas A, B, and C but can not detect targets in area D.



Answer the following questions briefly. Be sure to "walk" the reader through your diagrams in words if you use diagrams.

- A1 Describe a visual mechanism found in humans that is also likely to exist in any extraterrestrial alien with a visual system. Describe a visual mechanism that is unlikely to be the same. Provide brief arguments in support of your choices.
- A2 How does apparent motion work? How are we able to perceive motion that isn't really there? Draw a **diagram** to illustrate how two successively presented images can give the eye the impression that motion is present. How is this related to watching movies?
- A3 What is the advantage of using maps to represent visual input in the brain? What is the advantage of using maps to represent the body surface? Would maps be a good way to represent auditory input (hearing)? Would maps be a good way to represent olfactory input (smell)?
- A4 How does motion parallax work? Answer this question by drawing a **diagram** illustrating the relations between the location of the observer, the location of the objects in the scene, and the way that the motion of the observer allows an estimate of their distance. Explain the way in which the distance estimates depend on the speed of the observer.
- A5 Use a **diagram** to illustrate how the perception of Mach Bands may be the direct result of mutual lateral inhibition among ganglion cells in the retina.
- A6 How does visible persistence allow us to see more than is actually present on our retina at any point in time? Draw a **diagram** to illustrate how two successively presented images can give the eye the impression that more than one image is present simultaneously. How is this related to watching television?
- A7 Draw a **diagram** illustrating the difference between the wavelengths reaching the eye and the color that is actually perceived. Why do the wavelengths that reach the eye not have the same composition as the surface reflectance function of the surface being viewed? How does the brain solve this problem?
- A8 What is the general problem of object perception? Answer this question by drawing a **diagram** illustrating the important relations between physical aspects of the 3D scene and the characteristics of the associated 2D image. Discuss the relation in both directions. That is, what in the scene determines the nature of the image? What in the image is a clue to what lies in the scene?
- A9 According to Ramachandran, what sort of visual tasks can be performed by the unconscious, zombie-like parts of our brain? Can you think of any general principles that seem to distinguish these tasks from those that require consciousness?

- A10 Using a **diagram**, show the relationships between actual object size, retinal size, and viewing distance. When size constancy scaling is operating, which of these three values is forming the basis for perception? How does this help you understand the moon illusion?
- A11 Describe what happens when you cross your longest two fingers and touch both tips of your fingers with a pencil. How does this differ from what happens when you do the same thing with your fingers uncrossed? What basic principle of brain organization is illustrated by this simple demonstration.
- A12 The visual system has often been compared to the operation of a camera. Discuss the validity of the idea that seeing simply involves the eye taking pictures of the scenes before it.
- A13 Person X becomes blind in one eye. Illustrate which cues in the visual scene allow X to see the world in three dimensions.
- A14 Are human bodies special?
- A15 Imagine that you look straight up at the center of the blackboard in front of you, and just off to the *left* of where you are looking, a *red* light is flashing. Describe in detail the pathway that neural signals about this light take, from the retina to primary visual cortex. Be sure to describe the anatomical pathway, and, where relevant, the types of information about the stimulus that are encoded by different neurons along this pathway. (*Note. You do not need to include details about action potential initiation and propagation or synaptic transmission.*)
- A16 In each box, write the anatomical name it corresponds to.

