PSYC 3702 A

Mid-Term Examination

This exam has 19 pages including this page.
This booklet must be handed in before you leave the examination.

PRINT YOUR NAME:_____

PRINT YOUR STUDENT NUMBER: _____

INSTRUCTIONS: This examination is worth **30% of your final grade** for this course.

The exam consists of THREE PARTS. In each part the question format is different. You are free to answer any question in any part (or all questions, if you choose to do so), but see below for the marking scheme that is used. This marking scheme gives partial credit for partial knowledge. This same question formats will also be used on the 3-hour final examination for this course.

(1) **Multiple Choice** (50 points max) Each question is worth 1 pt. for a correct first choice and 1/2 point for a correct second choice.

(2) **Justified True/False** (30 points max) Each question is worth 2 points: To get 2 points on a question you must correctly circle True or False and justify your choice with a short statement of fact or elaboration. No points will be awarded without a justifying statement..

(3) **Short Answers** (no maximum) The answer to each question in this section is worth a maximum of 5 points. Partial marks will be given for in complete answers.

The object of this exam is to give you a chance to demonstrate how much you have learned to date in this course. There are more than 200 points worth of questions on this exam but the maximum mark you can receive on this exam is 100 points. Therefore, you have lots of choice and do not have to answer all questions to get a "perfect" score (however, there is no penalty for trying them all if you choose to do so). Your exam will be marked from the first question forward until you accumulate 100 points or until the marker reaches the end, whichever comes first. Thus, the latter part of your exam may remain unmarked if you accumulate 100 points earlier.

There is no "hard" time limit for this exam. It was written so that a student who has prepared for the exam can attempt enough questions to obtain his/her 100 points in 80 minutes, which is the nominal lecture period. If you choose to write longer than 80 min. you may be asked to move to a different room. Please listen for instructions from the prof or TA as to where this room is located. You will be responsible for carrying your exam and personal belongings to the new location and handing the exam in from there once complete.

If you have any questions regarding the exam, please indicate to me by raising your hand.

~ velis et remis ~

PART ONE: MULTIPLE CHOICE QUESTION FORMAT (50 points, maximum)

Read each question carefully and select the BEST answer.
WRITE YOUR FIRST AND SECOND CHOICE ANSWERS IN THE SPACES PROVIDED BELOW
1 point is awarded for each correct FIRST CHOICE answer and ¼ point for each correct SECOND CHOICE answer .

1. Which of the following describes the correct sequence of steps in the perceptual process?
   a. Environmental stimulus-stimulus on the receptors-transduction-neural processing
   b. Neural processing-transduction-perception-action
   c. Stimulus on the receptors-environmental stimulus-transduction-neural processing
   d. Transduction-stimulus on the receptors-neural processing-perception
   e. none of the above
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

2. The conversion of photic energy into electrical signals in the receptors is called
   a. perception.
   b. sensation.
   c. transduction
   d. all of the above.
   e. none of the above
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

3. Which of the following is an example information processing activity involving at least some “top-down” processing?
   a. Even from a distance Arnold was able to recognize the object as something he had seen before and could discern many of its details.
   b. Bob searched the forest scene carefully for the camouflaged deer.
   c. Charles was sleeping soundly until he was awakened by someone calling his name.
   d. Because he was walking on the beach, Darren guessed that the sensation he felt was caused by the sand in his shoes.
   e. All of the above.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

4. When considering the nature of conscious experience, "bottom-up processing" emphasizes _____ while "top-down processing" emphasizes _____.
   a. information received by the receptors; information contained in the brain
   b. memory, knowledge, and expectations; physical properties of stimuli
   c. observer's cognitive processes; transduction
   d. the stimulus on the receptor; the environmental stimulus
   e. the contribution of information from sensory processes; the contribution of past experience stored in long-term memory
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

5. *Psychophysics* is an approach to understanding perception that involves
   a. characterizing the physical properties of stimuli.
   b. characterizing the relation between stimuli and perception.
   c. studying the physical aspects of psychological experience.
   d. inferences about the mechanisms of neural information processing.
   e. none of the above
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

6. The absolute threshold refers to the
   a. minimum amount of distance between the stimulus and the observer that would permit the stimulus to be recognized.
   b. minimum amount of stimulus energy that is required for a stimulus to be detected.
   c. maximum amount of distance between an observer and a stimulus that would allow a stimulus to be detected.
   d. maximum amount of stimulus energy that would permit a stimulus to be recognized.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

7. Which of the following persons believed that the seat of the mind was in the heart?
   a. Aristotle
   b. Descartes
   c. Galen
   d. Kepler
   e. Leonard Cohen
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

8. Who proposed the doctrine of specific nerve energies?
   a. Aristotle
   b. Descartes
   c. Kepler
   d. Müller
   e. Helmholtz
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

9. Which neuron structure is responsible for conducting nerve impulses rapidly over long distances?
   a. large caliber axons
   b. dendrites
   c. organelles
   d. small caliber axons
   e. none of the above
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

10 Increasing the intensity of a stimulus can only increase the neuron's firing rate up to a limit. This limit is due to:
   a. nature of the all-or-none response.
   b. the refractory period between successive action potentials.
   c. the neuron's spontaneous activity.
   d. the maximum possible permeability of the neuron membrane.
   e. all of the above
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

11. The primary receiving area for vision is in which lobe of the cortex?
   a. Frontal
   b. Occipital
   c. Parietal
   d. Temporal
   e. Central
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

12 .Human beings can perceive light in the wavelengths between about
   a. 200-500 nm.
   b. 300-600 nm.
   c. 400-700 nm.
   d. 500-800 nm.
   e. 200-800 nm.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

13. The lateral geniculate nucleus is located in the
   a. colliculus.
   b. cortex.
   c. retina.
   d. thalamus.
   e. brainstem.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

14. A ray of light enters the eye and triggers electrical impulses that pass through various structures. Which of the following represents the correct order of the visual system's structures that are affected by the light?
   a. Lateral geniculate nucleus, optic nerve, extrastriate cortex, striate cortex
   b. Optic nerve, lateral geniculate nucleus, striate cortex, extrastriate cortex
   c. Optic nerve, ventral pathway dorsal pathway, visual cortex
   d. Retina, extrastriate cortex, striate cortex, lateral geniculate nucleus
   e. Visual cortex, association cortex, prefrontal cortex, temporal lobes
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

15. The <u>second</u> transparent structure though which light travels as it enters the eye is the
   a. cornea.
   b. pupil.
   c. lens.
   d. iris.
   e. aqueous humor.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

16. The axons of which type of nerve cells band together to form the optic nerve?
   a. Amacrine cells
   b. Bipolar cells
   c. Ganglion cells
   d. Horizontal cells
   e. Mueller cells
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

17. Although most of the initial focusing of light on the retina is done by the _____, it is the _____ that completes the task by changing its shape to focus the light coming in from near and far stimuli.
   a. cornea; lens
   b. iris; pupil
   c. lens; cornea
   d. pupil; iris
   e. pupil; lens
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

18 The process of accommodation created by action of the intraocular ciliary muscles increases the focusing power of the lens by making the lens
a. thicker.
b. less transparent.
c. more transparent.
d. thinner.
e. translate slightly towards the retina.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

19. Rods are located
a. mostly in the fovea but also in the peripheral retina.
b. mostly in the peripheral retina but also in the fovea.
c. only in the fovea.
d. only in the peripheral retina.
e. with highest density in the region about 10 degrees from the centre of gaze.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

20. What causes the blind spot?
a. In that part of the retina there are no photoreceptors.
b. In that spot the tips of the receptors face the back of the eye.
c. It is in an area that lacks ganglion cells.
d. It is the point at which the lens fails to accommodate.
e. All of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

21. The visual pigment molecules are located
a. at the base of the receptor outer segments.
b. in the discs of the receptor outer segments.
c. in the inner segment of the receptor.
d. on the outer surface of the receptor.
e. in the pigment epithelium.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

22. What is ***retinal***?
a. The jelly-like liquid that fills the inside of the eye
b. The layer of cells which contains the enzymes that are used by the receptors
c. The light-sensitive component of the visual pigment molecule
d. The protein component of the visual pigment molecule
e. None of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

23. The primary transduction event in vision involves the
a. absorption of quanta by the photopigments of the rods and cones.
b. change in shape of the visual pigment molecule in response to light.
c. change in the membrane permeability of the photoreceptor outer segments.
d. entry of visual information into the central nervous system
e. all of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

24. Based upon their experimental work, what did Hecht, Schlaer, and Pirenne calculate to be the minimum number of visual pigment molecules that must be isomerized in order for a person to "see" a flash of light?
a. 1-3
b. 7-10
c. 30-50
d. 100-200
e. 1000-2000
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

25. Which of the following statements about dark adaptation is TRUE?
a. At the beginning of dark adaptation, the rods are more sensitive than the cones.
b. Dark adaptation occurs in two stages: an initial slow stage and a later rapid stage.
c. The rods are more sensitive than the cones during the later phases of dark adaptation.
d. The rods begin their adaptation about 7-10 minutes after the beginning of dark adaptation.
e. It takes about an hour for the eyes to become fully dark adapted.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

26. How can we obtain a "pure" dark adaptation curve that has only a rod branch?
a. Conduct the experiment with a monochromatic light.
b. Shine the light on the peripheral retina.
c. Test a rod monochromat.
d. Use a small test light located at the centre of gaze.
e. All of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

27. To measure the cone spectral sensitivity curve,
    a. present test lights whose size is < 20 minutes of visual angle
    b. vary the wavelength of the test lights from 400nm to 700nm
    c. present the test light to the central fovea.
    d. alternate the test light with a standard white light at the rate of 30 times per second.
    e. all of the above
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

28. There is a row of flowers in your garden. In daylight their colour are, from left to right, Red, Yellow, Green and Blue. At noon you note that the brightest one is _____ while about 1/2 hour after sunset you notice that the brightest one is _____.
    a. green, red
    b. yellow, green
    c. red, blue
    d. green, red
    e. blue, yellow
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

29. The Purkinje shift refers to
    a. neurons that respond to movement in only one direction.
    b. the shift in vision that causes blues to appear brighter than reds in dim light.
    c. the shift in vision that causes blues to appear brighter than reds in intense light.
    d. the shift in vision that causes reds to appear brighter than blues in dim light.
    e. A backfield maneuver by the Carleton Ravens basketball team.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

30. The rod visual pigment is most sensitive to which wavelength of light?
    a. 435 nm
    b. 485 nm
    c. 505 nm
    d. 545 nm
    e. 575 nm
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

31. If we compare the "innervation ratio" of both rods and cones (that is, the numbers of either rod or cone receptors whose signals converge upon a single retinal ganglion cell we find that:
    a. foveal cones converge more than the peripheral rods.
    b. cones converge more.
    c. peripheral cones converge more than foveal cones.
    d. rods converge more than cones.
    e. both c and d
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

32 Which mechanism enables rods to detect small amounts of light in the dark?
    a. Lateral inhibition
    b. Neural convergence
    c. Pigment regeneration
    d. Spectral sensitivity
    e. all of the above
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

33. Cone visual acuity _____ rod visual acuity. This is because _____rods _____
    a. is absolutely better than ; less; are in the retina than cones.
    b. at night is worse than; foveal; are more tightly packed than cones.
    c. is absolutely better than ; peripheral; are more dense than cones.
    d. is better than; no; are present in the central fovea.
    e. by day is better than; the; are saturated at daytime levels of retinal illumination.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

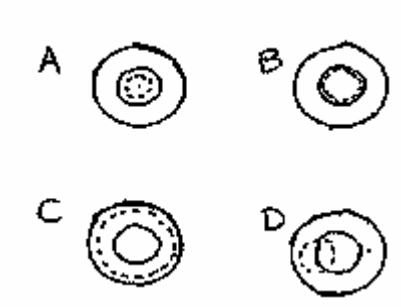
34. Before the lights went out in the theater, Joan was able to read the small print on her program by using _____ vision. Immediatly after the theater lights went out, Joan was able to see the back of the heads of the people seated in front of her by using _____ vision.
    a. foveal and peripheral; only foveal
    b. foveal and peripheral; only peripheral
    c. only foveal; only peripheral
    d. only peripheral; foveal and peripheral
    e. none of the above
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

35 A visual system receptive field is defined as the
    a. area in the visual cortex that receives signals from the retina.
    b. area of visual field that influences the firing rate of a single neuron.
    c. area of retina that when stimulated increases the firing rate of a neuron.
    d. neural circuit that is activated by the stimulation of one spot on the retina.

e. all of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

36 A neuron with an inhibitory center-excitatory surround receptive field will respond the <u>least</u> when we stimulate
a. only the center.
b. only the surround.
c. both the center and surround together.
d. part of the surround.
e. none of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

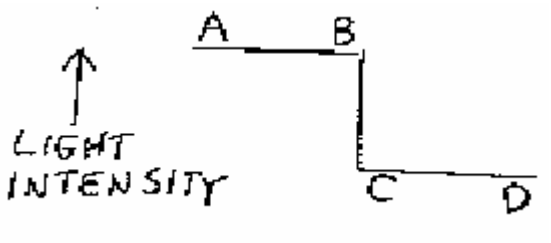
37. An excitatory center-inhibitory surround receptive field is shown below. The dashed area indicates the size of a disc of light presented to the receptive field. Which of the situations below will result in the maximum response?



a. A
b. B
c. C
d. D
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

38. Nerve impulses are recorded from the fiber of a single receptor (A) of a Limulus eye. If a neighboring receptor (B) laterally inhibits receptor A, which of the following conditions will result in the highest firing rate for receptor A?
a. Stimulate A (intensity = 10) and B (intensity = 10)
b. Stimulate only B (intensity = 20)
c. Stimulate only A (intensity = 10)
d. Stimulate A (intensity = 10) and B (intensity = 20)
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

39 The light distribution near a border is shown below. The perceived brightness caused by this distribution will be



a. greatest at A.
b. greatest at B.
c. greatest at C.
d. the same at A and B.
e. the same at A and D.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

40. The presence of Mach bands can be explained by
a. actual differences in the physical intensity of reflected light.
b. convergence.
c. lateral inhibition.
d. the Purkinje shift.
e. low pass spatial frequency masking
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

41. Most of the signals from the retina go directly to the
a. bipolar cells.
b. lateral geniculate nucleus.
c. superior colliculus.
d. visual cortex.

e. dorsal stream
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

42. Center-surround receptive fields are found
a. in both retinal ganglion cells and LNG neurons.
b. only in LGN neurons.
c. only in retinal ganglion cells.
d. only in simple cortical cells.
e. none of the above
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

43. The major function of the Lateral Geniculate Nucleus is to
a. combine the signals from the left and right eyes.
b. fire to stimuli with specific forms.
c. help in the detection of movement.
d. regulate the flow of information to the cortex.
e. control eye movements
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

44. The lateral geniculate nucleus receives inputs from which of the following?
a. Only the retina
b. Only the visual cortex
c. Only the brain stem
d. The retina, the brain stem, and the visual cortex
e. The brain stem and the thalamus
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

45. The lateral geniculate nucleus is made up of how many layers?
a. 2
b. 4
c. 5
d. 6
e. 8
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

46. Each layer of each LGN receives inputs from
a. both eyes.
b. either the contralateral or ipsilateral eye.
c. only the contralateral eye.
d. only the ipsilateral eye.
e. fast conducting retinal ganglion cells
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

47. If we record from neurons along an electrode track that penetrates perpendicular to the surface of the LGN we will encounter
a. individual neurons that respond to stimulation of both the left eye and the right eye.
b. neurons with receptive fields that have the same location on the retina.
c. neurons with receptive fields that are located next to each other on the retina.
d. neurons with receptive fields that are superimposed on the LGN.
e. neurons with receptive fields in about the same location on the retina in alternating eyes
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

48. Information about color is sent to the cortex via the _____ channel, which is made up of layers _____.
a. magno; 1 and 2
b. magno; 3, 4, 5, and 6
c. parvo; 1 and 2
d. parvo; 3, 4, 5, and 6
e. parvo; 5 and 6
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

49. A cat with a lesion in the magnocellular layer of the LGN would have the most difficulty in visually discerning whether a
a. bird was moving or standing still.
b. bowl was filled with milk or fruit punch.
c. mouse hole had real depth or was just a two-dimensional drawing.
d. rubber ball was smooth or rough.
e. all of the above
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

50. Which of the following represents the largest number?
a. The number of axons traveling from the LGN to the visual cortex
b. The number of cones in both eyes
c. The number of neurons in the visual cortex
d. The number of rods in one eye
e. The number of synapses in the visual cortex
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

51 A simple cell's orientation tuning curve would allow us to see how a cell responds when we change the
a. area of a stimulus.
b. intensity of a stimulus.
c. speed of movement of a stimulus.
d. vertical or horizontal positioning of a stimulus.
e. all of the above
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

52. Unlike simple cells, complex cells respond best to
a. complex light patterns.
b. moving stimuli.
c. small spots of light.
d. stationary stimuli.
e. specific orientations
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

53. Cells that are most effectively activated by a properly oriented moving line stimulus that is limited in its length at one or both ends are called:
a. center-surround.
b. complex.
c. end-stopped.
d. simple.
e. none of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

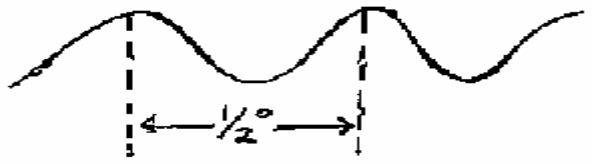
54. As we travel farther from the retina into the brain, the physical properties of stimuli needed to make visual neurons "fire" become
a. less intense.
b. more intense.
c. less specific.
d. more specific.
e. characteristic of real objects.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

55. Selective adaptation causes
a. an increase in the ability to see an object.
b. an increase in neural firing over time.
c. some neurons to become fatigued.
d. some neurons to become more sensitive over time.
e. none of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

56. Which of the following would occur first in a psychophysical experiment with selective adaptation to orientation?
a. Adapting the observer by presenting a grating stimulus with a particular orientation
b. Adapting the observer by presenting grating stimuli at a number of different orientations
c. Measuring the observer's contrast sensitivity for gratings of different orientations
d. Measuring the observer's contrast sensitivity to a vertically oriented grating
e. Measuring the observer's orientation discrimination threshold.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

57. The contrast of a grating refers to the
a. angle of the grating relative to horizontal.
b. angle of the grating relative to vertical.
c. amplitude of the grating's bright bars.
d. intensity difference of the grating's bright bars.
e. difference in the amplitude of the grating's bright and dark bars.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

58. The waveform of a sine wave grating is shown below. The spatial frequency of this grating is how many cycle(s) per degree?



a. 1
b. 2
c. 2-1/2
d. 3
e. cannot answer with the information given.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

59. If you were to view a group of buildings, which of the following would have the LOWEST spatial frequency?
    a. The windows on the buildings
    b. The bricks on the wall of a building
    c. The borders between light and dark areas
    d. The profile of the group of buildings
    e. none of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

60. The oblique effect is the tendency to have better contrast sensitivity for lines that are
    a. at an angle.
    b. curved.
    c. vertical or horizontal.
    d. wavy.
    e. oblique.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

61. Individual cells in the striate cortex called spatial frequency analyzers appear to respond to
    a. a narrow band of spatial frequencies.
    b. a wide range of spatial frequencies.
    c. a single spatial frequency only.
    d. different spatial frequencies at different times.
    e. gratings oriented at a specific angle
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

62. We use sine wave gratings to measure the contrast sensitivity function because
    a. sine wave gratings contain just one frequency.
    b. sine wave gratings are analogous to chemical elements; they can be combined to make more complex stimuli
    c. visual spatial sensitivity is known to vary with spatial frequency
    d. independent spatial frequency channels are believed to exist in the visual pathway and these channels are stimulated by sine wave gratings.
    e. all of the above
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

63. The contrast sensitivity function shows that humans are most sensitive to sine wave gratings with spatial frequencies of about
    a. 1 cycle per degree.
    b. 5 cycles per degree.
    c. 8 cycles per degree.
    d. 12 cycles per degree.
    e. 24 cycles per degree.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

64 . Experiments in which people are selectively adapted to a particular spatial frequency show
    a. support for the idea that spatial frequency channels are sensitive to a broad range of frequencies.
    b. support for the idea that there are channels in the visual system that are each sensitive to a narrow range of spatial frequencies.
    c. that adaptation to a grating decreases a person's sensitivity to all spatial frequencies.
    d. that adaptation to a grating with fine lines increases the contrast of other gratings with fine lines.
    e. all of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

65. After staring at a grating with wide bars, June shifts her glance to a grating with narrow bars. According to the idea of spatial frequency channels, the wide-barred grating will adapt channels in June's eyes that are sensitive to _____ spatial frequencies and she will therefore see the bars of the second grating as _____ than they actually are.
    a. high, thicker
    b. high, thinner
    c. low, thicker
    d. low, thinner
    e. none of the above
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

66. The visual cortical magnification factor means that
    a. neurons in the fovea have larger receptive fields than do neurons in the peripheral retina.
    b. a small area on the cortex represents a large area on the fovea.
    c. stimuli that we pay attention to will cause a larger electrical response than stimuli that we do not pay close attention to.
    d. an area of the fovea is allotted more space on the cortex than is the same-sized area in the peripheral retina.
    e. none of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

67. The density of ganglion cells is _____, but the density of cortical neurons is _____.
    a. highest for ganglion cells in the fovea region; the same throughout the cortex
    b. highest for ganglion cells in the peripheral retina; the same throughout the cortex
    c. the same in all areas of the retina; higher for the fovea's cortical neurons
    d. the same in all areas of the retina; higher for the peripheral retina's cortical neurons

e. none of the above
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

68 . Which of the following is in part a consequence of cortical magnification?
a. The blind spot
b. The decrease in sensitivity that occurs in selective adaptation
c. The different response functions of the magnocellular and parvocellular neurons
d. The high visual acuity of cones
e. none of the above
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

69. To record from a number of cortical neurons that have receptive fields on the same area of the retina, it is necessary to insert an electrode into the cortex so that it is oriented to the surface of the cortex in what manner?
a. Obliquely, at a 45 degree angle
b. Obliquely, at a 60 degree angle
c. Parallel
d. Perpendicularly
e. through a hole in the skull
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

70. A researcher is recording from an area of the visual cortex that receives inputs from receptors near the fovea. She moves an electrode 1-mm across the cortex (along an oblique electrode track). How would this recording compare with a recording made earlier, in the same manner, from the receptors in the peripheral retina?
a. In this recording, the neurons would tend to have retinal receptive fields that are close together, whereas in the earlier recording, the retinal receptive fields would be randomly dispersed.
b. In this recording, the neurons would tend to have retinal receptive fields that are randomly dispersed, whereas in the earlier recording, the retinal receptive fields would be close together.
c. This recording would reflect a smaller shift in the locations of the retinal receptive fields than the earlier one.
d. This recording would reflect a larger shift in the locations of the retinal receptive fields than the earlier one.
e. all of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

71. The 2-deoxyglucose technique has shown that
a. complex and end-stopped cells have a preferred orientation.
b. radioactively labeled 2-DG is taken up equally by all orientation-sensitive cells, regardless of their level of activity.
c. the centers and surrounds of receptive fields tend to oppose each other.
d. the visual cortex is arranged in orientation columns.
e. none of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

72. All of the following are types of columns in the visual cortex EXCEPT
a. location.
b. direction of motion
c. ocular dominance.
d. orientation.
e. colour
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

73. A single hypercolumn in the visual cortex consists of _____ ocular dominance column(s), many orientation columns and _____ location column(s).
a. 3; 1
b. 1; 2
c. 2; 1
d. 2; 2
e. 1; 1
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

74. A long bar-shaped stimulus presented to the retina will cause firing in which of the following?
a. In more than one hypercolumn
b. Only in ocular dominance columns
c. Only in location columns
d. Only in orientation columns
e. Only in a single hypercolumn
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

75. A long bar-shaped stimulus presented to the retina is translated in the cortex into
a. a long bar-shaped pattern of excitation.
b. a random pattern of excitation.
c. excitation of a number of orientation columns.
d. the firing of an entire hypercolumn.
e. all of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

76 . Astigmatism is a condition that is characterized by a
a. buildup of pressure in the eye.
b. clouded lens.
c. a cornea whose shape is more like a football than a basketball
d. lens that fails to accommodate to bend the incoming light.
e. none of the above.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

77. When neurons are said to have the property of contextual modulation, it means that they respond to
a. certain orientations.
b. salient stimuli.
c. specific spatial frequencies.
d. the length of stimuli.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

78. The two streams, which transmit signals from the striate cortex to the extrastriate cortex are the dorsal pathway, which leads to the _____ lobe and the ventral pathway, which leads to the _____ lobe.
a. frontal; lateral
b. lateral; parietal
c. parietal; temporal
d. temporal; parietal
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

79. Monkeys had great difficulty solving an "object discrimination" problem after researchers removed their
a. frontal lobes.
b. occipital lobes.
c. parietal lobes.
d. temporal lobes.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

80. Which pathway ends in the temporal lobe?
a. The "what" pathway
b. The "where" pathway
c. The "who" pathway
d. The "when" pathway
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

81. The "what" pathway begins
a. in the LGN layers that are important for movement perception.
b. in the parietal lobe.
c. in the temporal lobe.
d. with the retinal P ganglion cells.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

82. Current research on processing streams in the visual system indicates that
a. it is unlikely that channels play a major role in perception.
b. there are separate streams, but there is "cross-talk" between them.
c. there is actually little evidence for channels in the visual system.
d. the temporal and parietal channels are separated from one another.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

83. Based on their research with brain damaged patients, Milner and Goodale have concluded that the "where" pathway should be called the
a. secondary "what" pathway.
b. "when" pathway.
c. "how" pathway.
d. "whether" pathway.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

84. A patient suffered damage to her ventral processing stream from carbon monoxide poisoning, Following this damage, she could not
a. draw an apple from memory.
b. name the color of a screwdriver.
c. identify the details of a screwdriver.
d. orient a card to match the shape of a slot.
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

85. _____ appear to be mediated by independent structures in the brain.
a. location and orientation
b. perception and action
c. the perception of motion and orientation
d. "what" and "where"
FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

86. The modularity of the extra-striate cortex refers to the fact that
    a. different sections of it respond to different visual qualities.
    b. it consists of an extremely complex network of interconnected nuclei.
    c. it is mainly involved in higher-order processes, such as visual memory.
    d. the functions of its neurons can undergo change.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

87. It is possible to decrease a monkey's ability to experience movement by removing which part of its brain?
    a. Cortical area V4
    b. The inferotemporal cortex
    c. The medial temporal cortex
    d. The temporal lobe
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

88. The cortical area that appears to be a module for form perception is
    a. Area V5.
    b. frontal parietal lobe.
    c. the inferotemporal (IT) cortex.
    d. the medial temporal (MT) cortex.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

89. "Primary" cells in the inferotemporal (IT) cortex respond to
    a. color and texture.
    b. complex forms.
    c. motion.
    d. simple forms.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

90. The cortical area that is specialized to respond to faces and other complex objects with which a person has had extensive experience is
    a. located in the occipital lobe.
    b. located in the parietal lobe.
    c. the fusiform gyrus.
    d. the medial temporal cortex.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

91. Neurons that respond to a particular shape regardless of its size are called
    a. elaborate cells.
    b. primary cells.
    c. size-invariant cells.
    d. size-specific cells.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

92. The _____ neurons usually have _____ receptive fields.
    a. location-invariant; large
    b. size-specific; large
    c. size-invariant; small
    d. view-specific; large
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

93. In order to take in information about Form A, that is imaged on the same space also occupied by Form B (they are superimposed upon each other), it is necessary to
    a. be given information about what form A represents, before you even look at it.
    b. just direct the eyes towards form A, so it is imaged on the fovea.
    c. pay attention to form A.
    d. pay attention to both forms A and B, since they occupy the same space.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

94 . At the pet store, Jared's attention was drawn to a large fish tank filled with colorful, tropical fish. The swimming movements of the fish were causing neurons to fire with the greatest intensity in which part of his visual cortex?
    a. FFA
    b. IT cortex
    c. MT cortex
    d. V4
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

95. What does the "binding problem" refer to?
    a. The condition whereby a person is unable to recognize common objects or determine their orientation
    b. The mechanism by which learning shapes neural selectivity
    c. The restricted range of stimuli that will stimulate some neurons to fire
    d. The way that the information from different modules in the visual system is combined

    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

96. The idea that perception is determined by the addition of many elementary sensations is most closely associated with
    a. Gestalt psychology.
    b. feature integration theory.
    c. structuralism.
    d. the computational approach to object perception.
    e. none of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

97. Max Wertheimer, one of the founders of the Gestalt School, used the apparent movement of light to discredit which of the following as the basis for perception?
    a. Good continuation
    b. Illusory contours
    c. Proximity
    d. Elementary Sensations
    e. Ecologically valid stimuli
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

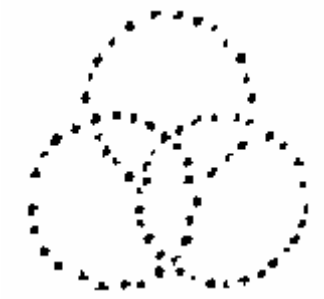
98. Perception of illusory contours is best explained in terms of the
    a. addition of sensations
    b. Gestalt laws of organization
    c. importance of the overall stimulus configuration
    d. recognition-by-components approach to object perception
    e. all of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

99. Which of the following Gestalt laws involves movement?
    a. Common fate
    b. Meaningfulness
    c. Proximity
    d. Similarity
    e. Pragnanz
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

100. The Gestalt laws are more accurately categorized as "heuristics" rather than "laws" because they
    a. account for every possible perceptual event.
    b. involve short cuts and guesswork.
    c. provide a systematic way to interpret sensational input.
    d. sacrifice speed for accuracy of perception.
    e. all of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

101. The Gestalt laws of organization may seem like statements of the obvious, because they
    a. ignore ambiguous stimuli that might cause conflicts between the laws.
    b. lead to the correct perception every time.
    c. only hold for the simplest types of perception.
    d. reflect regularities in the environment that we have become experts at perceiving.
    e. all of the above.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

102. While touring Yonge Street in Toronto, Alexa's eyes were focused on one particular neon sign. It consisted of three interlocking circles as in the diagram below. Even though all its light bulbs were the same color and all blinked on and off at the same time, Ellen was still able to perceive the image as three distinct circles. The grouping principle that would account for this is



    a. the common region principle.
    b. the good continuation principle
    c. the similarity principle.
    d. the synchronicity principle.
    e. least energy principle
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

103. One of the properties of figure-ground displays is that the
   a. contour separating the figure from the ground appears to belong to the ground.
   b. figure and ground cannot be perceived at the same time.
   c. ground is more memorable than the figure.
   d. ground is seen as being in front of the figure.
   e. all of the above.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

104. Which approach to object perception emphasizes the analysis of the intensity distribution in an image to locate its edges?
   a. Computational approach
   b. Feature integration theory
   c. Gestalt approach
   d. Recognition-by-components approach
   e. The information processing approach
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

105. All of the following would be considered basic elements of form perception in feature integration theory, EXCEPT
   a. Illuminant colour
   b. conjunctions of edges
   c. curvature of boundaries
   d. object movement.
   e. figure-ground contrast.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

106. The idea that basic features can exist independently of one another early in processing is most closely related to the physiological concept of
   a. specificity coding.
   b. shape-invariant neurons.
   c. distributed coding.
   d. brain modules that each mediate perception of one feature
   e. all of the above.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

107. Which search task below involves focused attention?
   a. Display: 1 green X; many red O's and blue X's. Task: Detect green X
   b. Display: 1 blue Y; 1 red X; many yellow Z's; and green O's Task: Detect blue Y.
   c. Display: 1 blue O; many red O's and blue X's. Task: Detect blue O
   d. Display: 1 red O; many blue O's and yellow X's. Task: Detect red O
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

108. What is the inverse projection problem?
   a. The difficulty inherent in perceiving mirror-reflected images
   b. The difficulty inherent in perceiving stimuli that have been rotated 180 degrees.
   c. The fact that any image on the retina could be produced by an infinite number of objects
   d. The fact that to a moving observer, objects at different distances appear to move in different directions
   e. The retinal image is upside down and backwards relative to the corresponding objects in space.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

109. Which of the following would be the easiest for a computer to determine?
   a. The edges of simple, visible objects
   b. The shapes of partially hidden objects
   c. Whether changes in lightness are due to illumination or to properties of the objects
   d. Whether intersecting lines are part of the same object or different objects
   e. The average illumination of a scene.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

110. How does the computer's ability to perceive objects compare with that of a human?
   a. Both are just about equal in their ability to perceive objects.
   b. Computers are better able to deal with ambiguous scenes, but humans are better able perceive simple scenes.
   c. Computers have much superior ability.
   d. Humans have much superior ability.
   e. There is no evidence that computers perceive anything.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

111. All of the following are examples of top-down processing EXCEPT
   a. breaking an object into primitives.
   b. inferring that an automobile that looks tiny when we see it from the 20^{th} floor of a building, is actually a normal size car.
   c. seeing animals in patterns made by clouds in the sky.
   d. determining shape from the shading of objects in a scene.
   e. selecting a colour sample that represents the colour of a familiar object.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

112. Subjects can more efficiently (e.g. more rapidly) identify an object if it appears in a familiar context (as when a loaf of bread was located in its correct place on a kitchen counter) than when it appears in an unfamiliar scene (as when a mailbox was located on a kitchen counter). This is believed to be due to
    a. geon extraction.
    b. neural specificity.
    c. the occlusion heuristic.
    d. top-down processing.
    e. the familiarity effect.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

113. The cue approach to depth perception focuses on identifying the
    a. aspects of the retinal image that allow us to perceive depth.
    b. depth clues that are transmitted by individual points of light.
    c. developmental stages of depth perception.
    d. mechanism through which a three-dimensional scene is converted into a two dimensional image.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

114. Which of the following depth cues involves the muscles of the eye?
    a. Convergence
    b. Linear perspective
    c. Motion parallax
    d. Relative size
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

115. The change in the shape of the lens that occurs when we focus on objects at varying close distances is called
    a. accommodation.
    b. accretion.
    c. convergence.
    d. occlusion.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

116. Jane knows that her friend Ned is farther away than the elm tree because the tree hides part of Ned's bicycle. Jane is using which of the following depth cues?
    a. Atmospheric perspective
    b. Binocular disparity
    c. Occlusion
    d. Texture gradient
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

117. Lisa wears a patch over one eye. Her friend Danielle does not. Which pictorial cue would help Lisa, but not Danielle, to perceive depth?
    a. Familiar size
    b. Linear perspective
    c. Relative size
    d. Texture gradient
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

118. Which of the following depth cues would be the most difficult to draw in an outline drawing such as a cartoon that has no shading?
    a. Atmospheric perspective
    b. Linear perspective
    c. Overlap
    d. Relative height
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

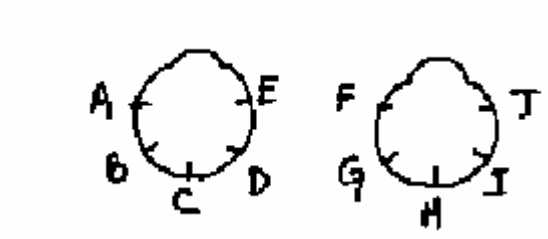
119. Parallel lines, such as railroad tracks, appear to converge as their distance from the observer increases. This describes the pictorial cue known as
    a. binocular disparity.
    b. convergence.
    c. linear perspective.
    d. relative height.
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

120. Which of the following is a monocular depth cue?
    a. Binocular disparity
    b. Convergence
    c. Stereopsis
    d. Texture gradient
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

121. Which of the following cues is primarily responsible for the vivid impression of depth created by the stereoscope?
    a. Binocular disparity
    b. Overlap
    c. Parallax
    d. Texture gradients
    FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

122. When two objects fall along the horopter, their images
   a. are cast on corresponding points of the two retinas.
   b. are cast on different areas of the two retinas.
   c. create crossed disparity.
   d. create uncrossed disparity.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

123. Which pairs of points on the two eyeballs below would have the largest angle of disparity?



   a. A and F
   b. B and J
   c. D and J
   d. B and G
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

124. The two eyes below are fixating on point X. Four points, A, B, C, and D, are located at the positions shown in the diagram. Which point will result in images with the greatest crossed disparity?

   a. A
   b. B
   c. C
   d. D
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

125. How can we demonstrate a connection between binocular depth cells and depth perception?
   a. Eliminate binocular depth cells by raising animals with monocular vision, and determine if stereopsis is present.
   b. Restrict animals' visual environment to random-dot patterns and test them for depth perception.
   c. See if animals with frontal eyes (like humans and cats) can see depth better than animals with eyes on the side (like rabbits).
   d. Test adult cats with one eye patched to see if they can still see depth.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

126. The brain area that is activated during stereopsis is the
   a. frontal cortex.
   b. occipital cortex.
   c. parietal cortex.
   d. temporal cortex.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

127. The correspondence problem concerns the difficulty inherent in
   a. eliminating pictorial cues from a visual scene.
   b. identifying disparity information as the source for depth perception.
   c. linking disparity selective neurons with their corresponding disparities.
   d. matching the input from two separate images.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

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128. Which of the following depth perception cues is effective at the whole range of depth perception?
   a. Atmospheric perspective
   b. Convergence
   c. Motion parallax
   d. Occlusion
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

129. In order to use disparity to perceive depth, an animal must have
   a. at least one functioning eye.
   b. echolocation.
   c. eyes with overlapping visual fields.
   d. lateral vision.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

130. An object's visual angle is determined by
   a. its physical size alone.
   b. its placement in the visual space.
   c. the speed at which it is moving.
   d. its size and distance from the observer.
   FIRST CHOICE ANSWER _____ SECOND CHOICE ANSWER_____

PART TWO: JUSTIFIED TRUE/FALSE (25 points, maximum)

Read each statement carefully and determine whether it is True or False. Write a one-sentence justification for your choice.

131. In an experiment to determine the minimum amount of light necessary to elicit the sensation of colour, the stimulus should be presented to the point of fixation.

   TRUE_____ FALSE_____

   JUSTIFICATION:_____

132. In an experiment to determine the maximum frequency at which a light that can be perceived as flickering, the stimulus should be large and presented to the peripheral visual field.

   TRUE_____ FALSE_____

   JUSTIFICATION:_____

133. In an experiment to determine the minimum change in spectral content of a light necessary to elicit a detectable change in hue, the stimulus should be presented to the point of fixation.

   TRUE_____ FALSE_____

   JUSTIFICATION:_____

134. In an experiment to determine the contrast sensitivity function, square wave gratings are presented at different spatial frequencies.
   TRUE_____ FALSE_____

   JUSTIFICATION:_____

135. The maximum density of rod photoreceptors occurs at about 15 degrees eccentric to the fixation point.

   TRUE_____ FALSE_____

   JUSTIFICATION:_____

136. There is a significant convergence of signals from the photoreceptors to the retinal ganglion cells in the foveal region.

   TRUE_____ FALSE_____

   JUSTIFICATION:_____

137. Unlike the photoreceptors of invertebrates, the photoreceptors of vertebrates depolarize when light is incident upon them.

   TRUE_____ FALSE_____

   JUSTIFICATION:_____

138. In an experiment using a person with normal colour vision as an observer, control over the intensity of a minimum of three

primaries is necessary to create an exact colour match between any two lights.

TRUE_____ FALSE_____

JUSTIFICATION:_____

139. Under ideal conditions for human observers, the minimum change in wavelength necessary to detect a just noticeable change in hue is about 1 nanometer.

TRUE_____ FALSE_____

JUSTIFICATION:_____

140. As one ages, the amount of short wavelength light that reaches the retina decreases.

TRUE_____ FALSE_____

JUSTIFICATION:_____

141. Under optimal observational conditions normal trichromatic observers can discriminates over a million colours.

TRUE_____ FALSE_____

JUSTIFICATION:_____

142. There are an infinite number of "complimentary pairs" of lights that, when combined, create a neutral or "white" light.

TRUE_____ FALSE_____

JUSTIFICATION:_____

143. If we had the same visual acuity across the entire retinal surface that we enjoy in the foveal pit, our brain would have to be about 2 times larger to accommodate the visual cortex necessary to process the information.

TRUE_____ FALSE_____

JUSTIFICATION:_____

144. Most people need glasses to read and perform "up close" work by age 50.

TRUE_____ FALSE_____

JUSTIFICATION:_____

145. The relationship between perceived and actual distance is nearly unity for distances less than about arm's length..

TRUE_____ FALSE_____

JUSTIFICATION:_____

146. There is an international standard for the specification of colour.

TRUE_____ FALSE_____

JUSTIFICATION:_____

147.
148. The transition from the state of light adaptation to one of dark adaptation takes at least 30 minutes to complete..

TRUE_____ FALSE_____

JUSTIFICATION:_____

149. The transition from the state of dark adaptation to one of light adaptation takes virtually no time at all.

TRUE_____ FALSE_____

PART THREE: SHORT ANSWERS

Read each statement carefully and write a short (no more than a paragraph) answer. (Each answer is worth a maximum of 5 points)
Write your answers on the blank back pages of this exam booklet. Be sure to highlight the question number beside the answer (to make it easier to follow the marking scheme)

150. Compare and contrast the trichromatic theory of colour vision with the opponent process theory.

151. Describe how spatial information is treated in the visual brain.

152. Discuss the role that perceptual mechanisms play in defining conscious experience.

153. Discuss the role that retinal anatomy has played in the history of neuroscience.

154. Support or refute the statement "the role of perceptual mechanisms is to provide the necessary information to build a useful model of the external world in the brain".

155. Of what adaptive significance is there to having a duplex retina?

156. Compare and contrast the dorsal and ventral streams of visual information in higher visual cortical areas following V1.

157. Describe the basic electrophysiological experiment for mapping out the receptive field of a retinal ganglion cell.

158. Discuss the Gestalt principles. Select one of them and provide a real-world example of how one might be used to optimize a given design.

159. Define the term "metamer". What is it and what does its existence tell us about the relationship between the physical world, perception and coursiousness?