Please cross the circles clearly. Zero, one or more answers are possible.

Which answer(s) is/are correct?

1. In the retina, there are no cone photoreceptors in:

O the center of the fovea

O the nasal part of the retina

X the blind spot

O the temporal part retina

1. Which statement(s) is/are correct:

X the density of cone photoreceptors decreases from the center to the retinal periphery

O rods are less light sensitive than cones

X rods are spatial frequency selective

X some women are tetrachromats

1. The principle of univariance refers to

O the fact that all humans share the same cone pigments

X the fact that changes in light wavelength can cause the same reaction in a photoreceptor as a change in light intensity

O the fact that humans have only one type of rod pigment

O the fact that receptor sensitivity varies with illumination intensity

1. Ganglion cell receptive fields are

O selective for the direction of motion

O elongated

O larger in the fovea than in retinal periphery

X larger than the receptive field of single cones

1. The axons of one eye’s retinal ganglion cells

O do not carry action potentials

X make up this eye’s optic nerve

O always cross to the contralateral hemisphere

O terminate only on simple cells in the primary visual cortex

1. A cell’s receptive field is non-linear if

X it shows saturation of the responses

X it shows masking

X it shows adaptation

O it obeys heterogeneity and superposition

1. The response of a linear receptive system to a sinusoidal input always is

X a sine wave with a frequency equal to that of the input frequency

O a sine wave with the same amplitude as that of the input

O a sine wave 180 deg out of phase compared to the input

O a sine wave with the same frequency and amplitude as the input

1. Fourier analysis

X claims that an arbitrary, continuous waveform can be decomposed into a sum of sine waves

X applies for signals varying in time, in space or both

X claims that a square wave can be decomposed into a fundamental sine frequency and its odd harmonics.

O claims that a square wave can be decomposed into a fundamental sine frequency and exactly three of its odd harmonics.

1. The human contrast sensitivity function (CSF) shows

X a lower sensitivity for low spatial frequencies compared to the peak sensitivity

X a sharp drop of sensitivity for high spatial frequencies (above 30 c/deg)

X the relation between an observer’s inverse contrast threshold and stimulus spatial frequency

O the relation between a stimulus’ spatial frequency and its temporal frequency

1. Which of the following statements is(are) correct?

X LGN receptive fields resemble those of ganglion cells

X The LGN is made of Magno-, Parvo- and Konio- layers

O The LGN projects to the contralateral primary visual cortex

X The LGN is retinotopically organized

1. Hebbian learning

X implies that the weight of synapses between two neurons vary as a function of the neurons’ activity

X implies that the weight of synapses between two neurons increases when the two neurons are active together

O implies that the weight of synapses between two neurons increases when the activity of the two neurons is uncorrelated

X has been observed in primary visual cortex

1. Primate V1 is

X retinotopically organized

O organized in direction of motion columns

X organized in spatial frequency columns

X made of 6 layers (**6 main layers, divided into sublayers**)

1. The spatial frequency selectivity of an individual V1 neurons is

O wider than that of a ganglion cell

O wider than the observer’s contrast sensitivity function

X narrower than that of a LGN neuron

X narrower than that of a photoreceptor

1. Cortical magnification means

O that the cortical representation of the foveal region is bilateral

O that the cortical representation of the peripheral retina is larger than that of the foveal region

X that the proportion of tissue analyzing foveal signals is higher in the cortex than in the retina

O that the representation of the foveal region increases in size within extrastriate cortex (not sure)

1. The response of a V1 complex cell

O has half the frequency of a drifting sine wave used as stimulus

X depends on stimulus orientation

O does not adapt to a constant visual input

O never saturates at high input contrasts

1. A “component” cell in area MT has a direction tuning (??)

O to plaids that looks similar to that for a single grating

O to plaids that has three distinct lobes

X to a single grating that has one distinct lobes

O to a 45 deg plaid that has two lobes at a 22.5 deg angle

1. To alter the preferred speed of a Reichhard detector, you can:

X alter the delay in one of the input lines (for direction)

O alter the threshold in the multiplicative stage

O alter the integration time constant of the multiplicative stage

O increase the distance between the receptors and increase their size proportionally (for direction)

1. The aperture problem in motion perception is solved by computing

O the binocular disparity of motion vectors

X the bisection of constraints

O the sum of the possible motion vectors

X where the lines of constraints cross one another