

New CED - Sensation Practice Exam (Sample)

Study Guide



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SAMPLE

Questions

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- 1. What theory explains how nerve impulses traveling up the auditory nerve correspond to the frequency of a tone, enabling pitch perception?**
 - A. Gate Control Theory**
 - B. Frequency Theory**
 - C. Place Theory**
 - D. Signal Detection Theory**
- 2. What process involves the conversion of one form of energy into another, particularly stimulus energies into neural impulses?**
 - A. Transduction**
 - B. Transmission**
 - C. Transformation**
 - D. Translation**
- 3. What term refers to the sense of taste, which helps meet nutritional needs and protects against toxins?**
 - A. Olfaction**
 - B. Taste Threshold**
 - C. Gustation**
 - D. Flavor Perception**
- 4. What part of the inner ear plays a crucial role in balance?**
 - A. Semi-circular canals**
 - B. Vestibule**
 - C. Cochlea**
 - D. Cochlear duct**
- 5. What is the primary function of the retina in the eye?**
 - A. To control the amount of light entering the eye**
 - B. To process visual information through receptors**
 - C. To focus light onto the lens**
 - D. To maintain ocular pressure**

- 6. What is the central focal point in the retina known as?**
- A. Macula**
 - B. Fovea**
 - C. Cornea**
 - D. Pupil**
- 7. What theory explains the opposing processes involved in color vision, such as red-green and yellow-blue?**
- A. Opponent-process theory**
 - B. Trichromatic theory**
 - C. Gesture theory**
 - D. Color constancy theory**
- 8. Which term describes the height of a wave measured from the peak to the trough?**
- A. Frequency**
 - B. Amplitude**
 - C. Wavelength**
 - D. Intensity**
- 9. How is the 'sweet' taste primarily experienced?**
- A. Through protein recognition**
 - B. Through sugar detection**
 - C. Through electricity stimulation**
 - D. Through acid evaluation**
- 10. What visual field characteristic is the fovea primarily responsible for?**
- A. Peripheral vision**
 - B. Monocular vision**
 - C. Central vision**
 - D. Binocular vision**

Answers

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1. B
2. A
3. C
4. A
5. B
6. B
7. A
8. B
9. B
10. C

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Explanations

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1. What theory explains how nerve impulses traveling up the auditory nerve correspond to the frequency of a tone, enabling pitch perception?

A. Gate Control Theory

B. Frequency Theory

C. Place Theory

D. Signal Detection Theory

Frequency Theory is the correct choice because it directly relates to how we perceive pitch through the frequency of nerve impulses traveling along the auditory nerve. According to this theory, the frequency of the sound wave corresponds to the rate at which auditory nerve fibers fire. For example, a higher frequency sound wave will cause the nerve fibers to fire more rapidly, which the brain interprets as a higher pitch. This mechanism allows our auditory system to translate the properties of sound waves into the perception of pitch. Gate Control Theory is not relevant here; it deals with pain perception and how certain neurological pathways can be blocked or facilitated in the spinal cord. Place Theory, while important in discussions of pitch perception, posits that different frequencies stimulate specific places along the cochlea, leading to pitch perception based on location rather than the rate of nerve impulses. Signal Detection Theory focuses on the processes of perception, such as the ability to distinguish between signal and noise in various conditions, but does not specifically address how pitch is determined through nerve impulses. Thus, the emphasis on the relationship between the frequency of the sound and the rate of neural firing makes Frequency Theory the most appropriate explanation for pitch perception in this context.

2. What process involves the conversion of one form of energy into another, particularly stimulus energies into neural impulses?

A. Transduction

B. Transmission

C. Transformation

D. Translation

Transduction is the process that specifically refers to the conversion of one form of energy into another. In the context of sensation, it involves the transformation of various types of stimulus energies—such as light, sound, or chemical signals—into neural impulses that the brain can interpret. This foundational mechanism is essential for sensory perception because it allows external stimuli to be transformed into the signals our nervous system understands, leading to the experience of sensation. The other terms listed do not accurately capture this specific process. Transmission typically refers to the method by which neural impulses are sent from one part of the nervous system to another, rather than the initial conversion process. Transformation, while it may imply a change, is too vague and does not specifically denote the conversion of energy types. Translation usually pertains to converting from one language to another or interpreting information, rather than the conversion of sensory stimuli into neural activity. Thus, transduction is the most precise term for this process in the context of sensory systems.

3. What term refers to the sense of taste, which helps meet nutritional needs and protects against toxins?

- A. Olfaction**
- B. Taste Threshold**
- C. Gustation**
- D. Flavor Perception**

The sense of taste, essential for assessing nutritional value and detecting harmful substances, is known as gustation. This term encompasses the physiological process by which taste buds on the tongue and other areas of the oral cavity detect different flavors—sweet, sour, salty, bitter, and umami. Gustation plays a critical role in food intake by influencing preferences and aversions, thus helping individuals recognize foods that are beneficial for their health, while also signaling potential dangers posed by toxic substances. Olfaction, the sense of smell, is closely linked to gustation and is sometimes confused with it; however, it pertains specifically to the detection of smell rather than taste. Taste threshold refers to the minimum concentration of a substance required for it to be perceived as having a taste, which aids in understanding sensitivity but does not directly define the broader sense of taste. Flavor perception involves the integration of taste and smell, but it is not synonymous with the act of taste alone. Therefore, gustation is the most accurate term to describe the fundamental sense responsible for tasting and evaluating food for nutrients and safety.

4. What part of the inner ear plays a crucial role in balance?

- A. Semi-circular canals**
- B. Vestibule**
- C. Cochlea**
- D. Cochlear duct**

The semi-circular canals are indeed vital for maintaining balance, as they are specifically designed to detect rotational movements of the head. These three fluid-filled structures are oriented at right angles to one another, allowing them to respond to movement in different directions. When the head moves, the fluid inside the canals shifts, which in turn stimulates hair cells within the ampullae, the enlarged regions at the base of each canal. This stimulation sends signals to the brain about the body's orientation and movement, helping us to maintain our balance and spatial orientation. The vestibule also contributes to balance, particularly in detecting linear acceleration and gravitational forces, but the semi-circular canals are specifically tailored for detecting rotational changes. The cochlea, on the other hand, is primarily involved in hearing by converting sound waves into neural signals, and the cochlear duct is a part of the cochlea that also serves this auditory function. Therefore, while all these structures have important roles in the inner ear, the semi-circular canals are the crucial components for balance.

5. What is the primary function of the retina in the eye?

- A. To control the amount of light entering the eye**
- B. To process visual information through receptors**
- C. To focus light onto the lens**
- D. To maintain ocular pressure**

The primary function of the retina is to process visual information through receptors. The retina is a thin layer of tissue located at the back of the eye, containing photoreceptor cells known as rods and cones. These cells are essential for converting light into electrical signals, which are then transmitted to the brain via the optic nerve. Rods are responsible for vision in low light conditions and peripheral vision, while cones enable color vision and detail recognition in bright light settings. By converting light stimuli into neural signals, the retina is critical for our ability to perceive images, colors, and movements in our environment. This processing function is fundamental to visual perception, linking the physical stimulation of light with the psychological experience of sight. Therefore, the correct answer underscores the retinal role in the complex process of vision, highlighting its significance in the overall function of the visual system.

6. What is the central focal point in the retina known as?

- A. Macula**
- B. Fovea**
- C. Cornea**
- D. Pupil**

The central focal point in the retina is referred to as the fovea. This area is crucial for high-acuity vision due to the high density of cone photoreceptors it contains, which are responsible for color vision and fine detail. The fovea is located within the macula, which encompasses a larger area of the retina responsible for central vision, but the fovea itself is specifically the point where vision is the sharpest. The cornea is the outer transparent layer of the eye that helps focus light, but it is not the focal point on the retina. The pupil is the opening in the center of the iris that regulates the amount of light entering the eye, rather than a specific point on the retina. Thus, the fovea plays a critical role in visual perception, making it the correct answer.

7. What theory explains the opposing processes involved in color vision, such as red-green and yellow-blue?

A. Opponent-process theory

B. Trichromatic theory

C. Gesture theory

D. Color constancy theory

The opponent-process theory is the correct explanation for color vision regarding the opposing processes such as red-green and yellow-blue. This theory posits that our perception of color is controlled by opposing pairs: for instance, stimulation of the red receptors in the eyes will create a sense of red, but if those receptors are inhibited, the sensation of green emerges. Likewise, the blue-yellow pairing functions similarly, where blue activation leads to a perception of blue, and its absence conveys a sense of yellow. This underlying mechanism describes how colors are processed in the visual system, where the activation of one color inhibits the perception of its opponent. It also helps account for afterimages and color blindness, illustrating the physiological responses of the visual pathways responsible for color discrimination. In contrast, the trichromatic theory describes color vision through three types of cones in the retina that are sensitive to different wavelengths of light, explaining how colors are mixed and perceived based on these three primary colors (red, green, and blue). Gesture theory and color constancy theory focus on different aspects of perception and are not aimed at explaining the opposing processes inherent in color vision.

8. Which term describes the height of a wave measured from the peak to the trough?

A. Frequency

B. Amplitude

C. Wavelength

D. Intensity

The term that describes the height of a wave measured from the peak to the trough is amplitude. Amplitude specifically refers to the maximum extent of a wave's oscillation from its rest position, which can be visually understood as the distance from the highest point (peak) of the wave to the lowest point (trough). This measurement is crucial because it is directly related to the energy carried by the wave; a higher amplitude indicates more energy. In contrast, frequency refers to how many cycles of the wave occur in a given period, wavelength is the distance between successive peaks or troughs, and intensity pertains to the amount of energy that passes through a unit area over a specified time. None of these terms capture the concept of vertical height between the peak and trough as amplitude does.

9. How is the 'sweet' taste primarily experienced?

- A. Through protein recognition
- B. Through sugar detection**
- C. Through electricity stimulation
- D. Through acid evaluation

The experience of the 'sweet' taste is primarily attributed to sugar detection. When sugars such as glucose and fructose enter the mouth, they bind to specific taste receptors on the taste buds, particularly T1R2 and T1R3 receptors. This binding initiates a series of biochemical events that ultimately send signals to the brain, which interprets the sensation as sweetness. This mechanism is crucial because it not only involves the chemical properties of sugars but also their ability to activate taste receptors specifically designed for sweetness. Sugars are a significant source of energy, and the sweet taste serves as a signal to consume energy-rich food, which is why the body has evolved these specific pathways for sugar detection. Understanding this process emphasizes the importance of detecting sugars in our diet, while also illustrating how different tastes are linked to biological needs and evolutionary functions.

10. What visual field characteristic is the fovea primarily responsible for?

- A. Peripheral vision
- B. Monocular vision
- C. Central vision**
- D. Binocular vision

The fovea is primarily responsible for central vision due to its high concentration of cone photoreceptors, which are sensitive to fine detail and color. Located at the center of the retina, the fovea allows for sharp visual acuity, enabling us to perceive details clearly when we look directly at objects. This is crucial for activities such as reading and recognizing faces, where clarity and precision in vision are essential. The fovea's role in central vision stands distinct from other aspects of vision, such as peripheral vision, which is managed by other areas of the retina with a higher concentration of rod cells that are more sensitive to motion and low light but not detail.