Electroencephalogram (EEG) Registry Practice Exam (Sample)

Study Guide

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Questions

1. Which of the following would not be considered a normal EEG pattern for a full-term infant?

A. Trace alternant

B. Isolated frontal sharp waves

C. Persistent focal alpha frequency activity

D. Beta-delta complexes in quiet sleep

2. What neurological condition is characterized by rapid muscle contractions that may arise from drug treatment?

A. Myoclonus

B. Tardive Dyskinesia

C. Essential Tremor

D. Cerebral Palsy

3. A typical full-term neonate usually enters into sleep in which state?

A. Stage 1 non-REM

B. Stage 2 non-REM

C. Stage 3 non-REM

D. REM state

4. What neurological disorder is characterized by abnormal eye movements due to vestibular dysfunction?

A. Tourette syndrome

B. Nystagmus

C. Lermoyez syndrome

D. Vestibular neuritis

5. What is a key symptom of Tay-Sachs Disease?

A. Degeneration of skeletal muscle

B. Early seizure onset

C. Visual impairment

D. Frontal lobe atrophy

6. What is the typical resting potential of a neuron?

- **A. -50 to -100 mV**
- **B. -70 to -90 mV**
- **C. -30 to -50 mV**
- **D. 0 to -10 mV**

7. Which of the following discharges is most commonly associated with abnormalities on a neurological exam?

- **A. 3/sec spike-wave**
- **B. 6/second spike-wave**
- **C. 2/second spike-wave**
- **D. Rolandic spikes**

8. What condition does not typically result in sensory aphasia?

- **A. Brain injury**
- **B. Stroke**
- **C. Epilepsy**
- **D. Neurological disorder**

9. Which of the following is not a unit for measuring alternating frequencies?

- **A. Cycles per sec**
- **B. Volts**
- **C. Hertz**
- **D. Kilocycles**

10. What is the primary function of the vestibular system?

- **A. Regulating blood circulation**
- **B. Maintaining equilibrium**
- **C. Processing auditory information**
- **D. Coordinating muscle movement**

Answers

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

Explanations

1. Which of the following would not be considered a normal EEG pattern for a full-term infant?

A. Trace alternant

B. Isolated frontal sharp waves

C. Persistent focal alpha frequency activity

D. Beta-delta complexes in quiet sleep

Persistent focal alpha frequency activity is not considered a normal EEG pattern for a full-term infant. In infants, particularly in the first year of life, alpha activity is typically not prominent, as alpha rhythms generally emerge later during development, around the ages of 2 to 5 years. When alpha frequencies do appear, they are usually symmetrical and diffuse rather than focal, indicating that the brain is maturing correctly. Therefore, the presence of persistent focal alpha activity may signify an underlying abnormality or atypical brain maturation, which is why this pattern would be viewed as abnormal in a full-term infant's EEG. The other mentioned patterns are well-documented as normal EEG features in full-term infants. For example, trace alternant is a common pattern seen in infants, characterized by alternating low-voltage mixed-frequency activity. Isolated frontal sharp waves can also be considered a benign finding in this age group, often seen in healthy infants. Beta-delta complexes can occur during quiet sleep and are generally regarded as a normal variant. Collectively, these patterns align with the expected developmental EEG characteristics of infants, making them normal variants.

2. What neurological condition is characterized by rapid muscle contractions that may arise from drug treatment?

A. Myoclonus

B. Tardive Dyskinesia

C. Essential Tremor

D. Cerebral Palsy

The condition characterized by rapid muscle contractions and is associated with drug treatment is tardive dyskinesia. This neurological disorder often develops after long-term use of antipsychotic medications and manifests as involuntary, repetitive movements, typically affecting the face, tongue, and limbs. These movements can be sudden and jerky, resembling rapid muscle contractions. Tardive dyskinesia results from alterations in the dopaminergic system due to the prolonged exposure to certain medications, leading to dysregulation of neurotransmission and resulting in motor disturbances. Recognizing the link between the use of specific drugs and the onset of tardive dyskinesia is crucial for both prevention and management of the condition. In contrast, myoclonus refers to quick, involuntary muscle jerks that can be caused by various conditions, not specifically related to drug treatment. Essential tremor involves rhythmic shaking, typically in the hands, and is not tied to rapid muscle contractions induced by medication. Cerebral palsy is a group of disorders affecting movement and coordination due to brain development issues, not directly linked to drug treatment effects. Understanding these distinctions is key in identifying and addressing the correct condition in clinical settings.

3. A typical full-term neonate usually enters into sleep in which state?

A. Stage 1 non-REM

B. Stage 2 non-REM

C. Stage 3 non-REM

D. REM state

In a typical full-term neonate, sleep generally begins in the REM state. This is significant because infants spend a considerable amount of their sleep time in REM, which may be crucial for cognitive development and brain maturation. During REM sleep, the brain is very active, which is believed to play a role in processing experiences and learning. Neonates have a unique sleep pattern compared to older children and adults, who often transition from lighter non-REM stages into deeper sleep before entering REM. The prominence of REM sleep in the sleep architecture of neonates aligns with their developmental needs, as this stage facilitates essential neurological and physiological functions. Therefore, when considering the sleep initiation state of a typical full-term neonate, the REM state is the correct choice due to its critical role in early brain development and overall sleep patterns observed in newborns.

4. What neurological disorder is characterized by abnormal eye movements due to vestibular dysfunction?

A. Tourette syndrome

B. Nystagmus

C. Lermoyez syndrome

D. Vestibular neuritis

Nystagmus is characterized by involuntary, repetitive eye movements that can be horizontal, vertical, or rotational. These abnormal eye movements often result from vestibular dysfunction, which affects the balance and spatial orientation systems in the body. The vestibular system, located in the inner ear, plays a crucial role in maintaining balance and coordinating eye movements with head position and motion. In nystagmus, the eye movements can arise from various causes, including congenital issues, vestibular disorders, neurological conditions, or metabolic disorders. The hallmark of nystagmus is that it is often initiated or exacerbated by changes in head position, confirming its association with vestibular function. While other conditions listed may involve eye movement abnormalities or neurological features, they do not specifically describe the involuntary eye movements seen in nystagmus that stem from vestibular dysfunction. For instance, Tourette syndrome primarily involves motor and vocal tics, while Lermoyez syndrome describes a specific type of episodic vertigo and vestibular dysfunction but not nystagmus itself. Vestibular neuritis can indeed lead to nystagmus as a symptom, but it is not a direct characterization of the disorder itself; rather, it represents a condition that can cause n

5. What is a key symptom of Tay-Sachs Disease?

A. Degeneration of skeletal muscle

B. Early seizure onset

C. Visual impairment

D. Frontal lobe atrophy

A key symptom of Tay-Sachs Disease is visual impairment. This neurodegenerative disorder, which is most commonly seen in infants, is caused by a deficiency of the enzyme hexosaminidase A. This deficiency leads to the accumulation of GM2 gangliosides in nerve cells, particularly in the brain and spinal cord, disrupting normal function. As the disease progresses, children with Tay-Sachs typically exhibit a range of neurological symptoms, including developmental delays and visual impairment. The loss of visual function is particularly notable as it often occurs early in the disease course as the retinal cells are affected by the accumulation of gangliosides. Children may also exhibit a "cherry-red spot" in the macula when observed through an eye examination. While early seizure onset, degeneration of skeletal muscle, and frontal lobe atrophy can occur in various neurological conditions, these are not the hallmark symptoms of Tay-Sachs. Visual impairment is specifically linked to the pathological mechanisms of the disease, making it the most recognized symptom in affected individuals.

6. What is the typical resting potential of a neuron?

A. -50 to -100 mV

B. -70 to -90 mV

C. -30 to -50 mV

D. 0 to -10 mV

The typical resting potential of a neuron is generally around -70 to -90 mV, which reflects the balance of ionic concentrations across the membrane and the permeability of the membrane to ions at rest. This resting membrane potential is crucial for generating action potentials and maintaining the neuron's ability to respond to stimuli. When discussing the range of resting potential, it's important to understand that it represents the electrical charge difference across the neuronal membrane when the neuron is not actively firing. The negative sign indicates that the inside of the neuron is negatively charged relative to the outside. In the context of the options presented, while the choice indicating -50 to -100 mV seems like it has some overlap with the typical range, the more precise and widely accepted range is -70 to -90 mV. This range stems from the equilibrium established largely by potassium (K+) ions and the neuron's selectively permeable membrane during resting conditions, which facilitates the maintenance of hyperpolarization necessary for proper neuronal function. Understanding the typical resting potential is fundamental for grasping concepts like action potentials and synaptic transmission, making this knowledge essential for anyone studying EEG and neuronal dynamics.

7. Which of the following discharges is most commonly associated with abnormalities on a neurological exam?

A. 3/sec spike-wave

B. 6/second spike-wave

C. 2/second spike-wave

D. Rolandic spikes

The correct answer focuses on the 2/second spike-wave discharge, which is notably linked to specific neurological abnormalities. This type of spike-wave discharge is most commonly associated with conditions such as absence seizures, which can manifest as distinct neurological deficits during an EEG examination. The presence of this discharge can indicate underlying neurological disorders that impact cognitive function or awareness, making it a crucial finding when evaluating a patient with suspected epilepsy or other neurological issues. In contrast, other spike-wave frequencies, while they may also indicate certain types of seizure activities, do not have the same degree of association with identifiable neurological abnormalities on examination. For instance, 3/sec and 6/sec spike-wave complexes are frequently seen in different seizure types but are less directly correlated with observable deficits during a neurological exam. Similarly, Rolandic spikes are often benign and commonly observed in children, often without significant behavioral or cognitive impairments. Thus, the 2/second spike-wave discharges are particularly significant in the context of linking EEG findings with neurological evaluation and serve as an important indicator for clinicians.

8. What condition does not typically result in sensory aphasia?

A. Brain injury

B. Stroke

C. Epilepsy

D. Neurological disorder

Sensory aphasia, often associated with Wernicke's aphasia, primarily results from damage to specific areas of the brain, particularly in the left hemisphere, affecting language comprehension abilities. The condition leads to difficulties in understanding spoken or written language, while the production of speech may remain fluent but nonsensical. When considering the options, epilepsy is less typically associated with sensory aphasia because, while seizures can affect brain function and may cause transient language issues during ictal or postictal states, they do not generally lead to the lasting language impairments characteristic of sensory aphasia. In contrast, brain injuries and strokes, especially those affecting the language centers, are known to result in sensory aphasia. Neurological disorders can also encompass a range of conditions that might involve similar language comprehension deficits, depending on their nature and severity. Thus, epilepsy stands out as the condition that does not ordinarily lead to persistent sensory aphasia, making it the correct choice in this context.

9. Which of the following is not a unit for measuring alternating frequencies?

A. Cycles per sec

B. Volts

C. Hertz

D. Kilocycles

Volts is the correct choice because it is a unit used to measure electrical potential or voltage, rather than frequency. In the context of measuring alternating frequencies, the other options are all related to the measurement of how often a wave cycles in a second, which is what frequency represents. Cycles per second, Hertz, and kilocycles all refer directly to frequency: cycles per second is a traditional unit that describes the number of complete cycles a waveform goes through in one second, Hertz is the modern standard unit that specifies the same concept (with 1 Hz equal to 1 cycle per second), and kilocycles, while somewhat dated, represents 1,000 cycles per second. Therefore, these terms are units that quantify frequency, distinguishing them from volts, which is solely a measure of electric potential.

10. What is the primary function of the vestibular system?

A. Regulating blood circulation

B. Maintaining equilibrium

C. Processing auditory information

D. Coordinating muscle movement

The primary function of the vestibular system is to maintain equilibrium. This system, which is located in the inner ear, is essential for balance and spatial orientation. It helps the body determine its position relative to gravity and motion, which is crucial for staying upright and coordinating movements effectively. The vestibular system consists of structures such as the semicircular canals and otolith organs, which detect changes in head position and motion. This information is sent to the brain, where it is integrated with visual and proprioceptive information to produce a coherent sense of balance. This function is especially important in activities that involve movement, as it allows for the adjustment of posture and maintaining stability, thus preventing falls and facilitating smooth movements. While other systems are responsible for regulating blood circulation, processing auditory information, and coordinating muscle movement, these functions are not within the primary role of the vestibular system. Each of those areas has its own specific systems (such as the cardiovascular system for circulation, the auditory system for hearing, and the motor system for muscle coordination) that operate independently of the vestibular functions.