Spriggs Essentials Sleep Technicians Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

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Questions

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1. Which scenario is most likely to cause electrode popping?
   A. Electrodes not firmly attached to the face or scalp
   B. Direct pressure against an electrode
   C. Poor patient ground connection
   D. A and C are correct

2. What type of artifact is commonly caused by patient movement during a sleep study?
   A. Electrical artifact.
   B. Respiratory artifact.
   C. Movement artifact.
   D. Calibration artifact.

3. If the measurement from T6 to Pz is 8 cm, what is the distance from P4 to Pz?
   A. A. 2 cm
   B. B. 4 cm
   C. C. 6 cm
   D. D. 8 cm

4. Which of the following is not true of muscle artifact?
   A. It is often seen when the patient is anxious or tense.
   B. It will likely resolve once the patient falls asleep.
   C. It can obscure relevant waveforms making scoring difficult.
   D. It is best corrected by using the notch filter.

5. Which equation correctly represents sensitivity in EEG recordings?
   A. Sensitivity = pen deflection/voltage
   B. Voltage = sensitivity/pen deflection
   C. Sensitivity = voltage/pen deflection
   D. Pen deflection = sensitivity/voltage

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6. If the distance from T6 to Pz is stated as 8 cm, how far is it from C3 to Pz?

- **A. A. 4 cm**
- **B. B. 6 cm**
- **C. C. 8 cm**
- **D. D. Varies depending on head size**

7. The symbol "G1" in polysomnography represents what?

- **A. The exploring electrode**
- **B. The reference electrode**
- **C. The patient ground**
- **D. The output of a differential amplifier**

8. Which variable is crucial for accurate EEG frequency calculations?

- **A. Paper speed**
- **B. Channel sensitivity**
- **C. Calibration rate**
- **D. Waveform height**

9. Where should the chin EMG electrodes be placed?

- **A. Jaw and above chin**
- **B. Above and below chin**
- **C. Mentalis and jaw**
- **D. Tibialis and mentalis**

10. Which filter settings should be used for recording airflow and respiratory effort?

- **A. LFF = 10 Hz, HFF = 100 Hz**
- **B. LFF = 1 Hz, HFF = 30 Hz**
- **C. LFF = 0.3 Hz, HFF = 30 Hz**
- **D. LFF = 0.1 Hz, HFF = 0.5 Hz**

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Answers

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

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Explanations

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1. Which scenario is most likely to cause electrode popping?

A. Electrodes not firmly attached to the face or scalp

B. Direct pressure against an electrode

C. Poor patient ground connection

D. A and C are correct

Electrode popping is often associated with issues related to the attachment and grounding of the electrodes on the patient’s skin. When electrodes are not firmly attached to the face or scalp, it can lead to fluctuations in the impedance at the electrode-skin interface. This situation may allow for the generation of artifact signals that resemble popping sounds, which can interfere with the clarity of the recorded data. Additionally, if there is a poor patient ground connection, it can also contribute to this popping sound. A weak ground connection may result in electrical noise, which further disrupts the signal quality and may be perceived as popping. Thus, the choice that indicates both the lack of proper electrode attachment and a poor ground connection is correct, as both scenarios increase the likelihood of electrode popping due to changes in electrical impedance and noise due to grounding issues.

2. What type of artifact is commonly caused by patient movement during a sleep study?

A. Electrical artifact.

B. Respiratory artifact.

C. Movement artifact.

D. Calibration artifact.

The type of artifact commonly caused by patient movement during a sleep study is best identified as a movement artifact. This type of artifact occurs when the patient shifts their position, which can disrupt the signals being recorded by the various monitoring devices used in polysomnography. Movement artifacts can manifest as abrupt changes or irregular patterns in waveforms, making it difficult to accurately assess physiological parameters such as brain activity, heart rate, or respiratory patterns. Understanding movement artifacts is crucial for sleep technicians, as distinguishing them from true physiological changes is essential for proper interpretation of the data collected during a sleep study. Addressing patient movement—through positioning, instruction on remaining still, or using devices that minimize the impact of movement—can help improve the quality of the study and lead to more accurate diagnoses.

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3. If the measurement from T6 to Pz is 8 cm, what is the distance from P4 to Pz?

A. A. 2 cm

B. B. 4 cm

C. C. 6 cm

D. D. 8 cm

To determine the distance from P4 to Pz based on the measurement given from T6 to Pz, it is essential to understand the standard placements of the electrode sites on the scalp as outlined by the 10-20 system. In this system, T6 is located on the temporal area, while Pz is positioned on the parietal area towards the back of the head. Since the distance from T6 to Pz is given as 8 cm, this represents a certain segment of the overall layout. P4, being located more laterally on the scalp in the parietal region, will have a distance to Pz that is less than the distance from T6 to Pz. The locations are organized such that P4 is situated approximately halfway between T6 and Pz due to the symmetry of the 10-20 system. Thus, taking into consideration the standard distances typically observed in these measurements and the fact that the distance from T6 to Pz is 8 cm, P4 to Pz would indeed be about half of that distance, which results in 4 cm. This understanding of the electrode placements and their relative distances confirms that the correct answer is 4 cm.

4. Which of the following is not true of muscle artifact?

A. It is often seen when the patient is anxious or tense.

B. It will likely resolve once the patient falls asleep.

C. It can obscure relevant waveforms making scoring difficult.

D. It is best corrected by using the notch filter.

Muscle artifact refers to signals picked up by the electroencephalography (EEG) or electromyography (EMG) systems that are produced by muscle activity rather than brain activity. Understanding this concept helps clarify why a specific statement about addressing muscle artifact is not correct. When muscle artifacts occur, they can significantly obscure the underlying brain activity shown in EEG recordings, which makes accurate scoring of sleep stages challenging. Therefore, recognizing that muscle activity often manifests as artifacts emphasizes option C's relevance in understanding the implications of muscle activity on data quality. The other statements reflect accurate observations about muscle artifact. It's commonly observed when the patient is anxious or tense, as highlighted in option A, due to increased muscle tone related to stress. Option B supports the idea that muscle artifacts can diminish as the patient relaxes and falls asleep, leading to reduced muscle activity and therefore clearer signals. However, the use of a notch filter is typically aimed at eliminating specific frequency interference (like 60 Hz electrical noise) rather than resolving muscle artifacts, which stem from physiological movements. Hence, believing that muscle artifacts can be best corrected by a notch filter presents a misunderstanding of the nature of muscle activity versus types of electrical interference.

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5. Which equation correctly represents sensitivity in EEG recordings?

- A. Sensitivity = pen deflection/voltage
- B. Voltage = sensitivity/pen deflection
- **C. Sensitivity = voltage/pen deflection**
- D. Pen deflection = sensitivity/voltage

The equation that correctly represents sensitivity in EEG recordings is defined as the ratio of voltage to pen deflection. Sensitivity refers to how responsive the EEG system is to electrical potentials. A higher sensitivity means that even small changes in voltage will result in a noticeable deflection of the pen on the recording medium. Specifically, the formula for sensitivity can be expressed as: Sensitivity = Voltage / Pen Deflection This means that if we increase the voltage (the electrical signal detected by the electrodes), the pen will deflect more on the recording, allowing for greater detection of subtle changes in neural activity. The concept behind this is crucial in EEG, as it helps technicians and clinicians accurately interpret brain activity by ensuring that the recorded signals are appropriately scaled for analysis. The other options reflect incorrect relationships and would not yield the correct understanding or calculation of sensitivity in EEG recordings. For example, if sensitivity is represented as pen deflection over voltage or any variation that misrepresents the inherent relationship, it would lead to confusion in interpreting the data effectively.

6. If the distance from T6 to Pz is stated as 8 cm, how far is it from C3 to Pz?

- A. A. 4 cm
- B. B. 6 cm
- C. C. 8 cm
- **D. D. Varies depending on head size**

The correct answer is that the distance from C3 to Pz varies depending on head size. In electroencephalography (EEG) and sleep studies, the placement of electrodes is often determined using the 10-20 system, which relies on the dimensions of the head to ensure consistent and reliable electrode placement across different individuals. The specific distances may not be the same for everyone due to variations in head circumference. While there are standard measurements for electrode placement, individual anatomical differences can lead to variations in those distances. Therefore, while the distance from T6 to Pz may be a fixed measurement (8 cm in this case), the distance from C3 to Pz is not universally defined and will indeed vary based on the individual's head size. This understanding is crucial for accurate electrode placement to ensure consistent data collection in sleep studies and other neurological examinations.

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7. The symbol "G1" in polysomnography represents what?

A. The exploring electrode

B. The reference electrode

C. The patient ground

D. The output of a differential amplifier

In polysomnography, the symbol "G1" typically represents an exploring electrode, which is used to monitor and detect brain wave activity by picking up electrical signals from the scalp. This electrode is placed on the patient's head and is essential for recording specific brain regions during sleep studies. The exploring electrode helps provide valuable data for analyzing sleep stages, detecting sleep disorders, and understanding the overall brain function during sleep. In the context of polysomnography, other options refer to different components or functions in the monitoring setup. The reference electrode is usually paired with the exploring electrode to help reduce noise and improve the quality of the recorded signals. The patient ground serves to minimize electrical interference and ensure stable recordings, while the output of a differential amplifier refers to the processed signal produced by amplifying the difference between the signals from two electrodes, which is crucial for accurate readings in neurophysiological studies. However, "G1" directly signifies the specific role of an exploring electrode in capturing the brain's electrical activity.

8. Which variable is crucial for accurate EEG frequency calculations?

A. Paper speed

B. Channel sensitivity

C. Calibration rate

D. Waveform height

The variable that is crucial for accurate EEG frequency calculations is the paper speed. In electroencephalography (EEG), the frequency of brain waves is determined by how many cycles of the waveform occur within a specific time frame. The paper speed, which dictates how quickly the EEG recording is made on the paper or digital medium, directly influences the representation of that time. If the paper speed is set too fast or too slow, the waves may be squished together or stretched out, leading to inaccurate frequency measurements. For instance, when the paper speed is increased, the time between wave peaks decreases, resulting in a higher frequency reading. Conversely, a reduced paper speed could misrepresent the frequency as lower than it truly is. Understanding the impact of paper speed is essential for EEG technicians. Ensuring the correct paper speed is set allows for accurate interpretation of brain wave activity, enabling better diagnoses and assessments of neurological conditions based on precise frequency calculations.

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9. Where should the chin EMG electrodes be placed?

A. Jaw and above chin

B. Above and below chin

C. Mentalis and jaw

D. Tibialis and mentalis

The placement of chin EMG electrodes is crucial in sleep studies for accurately assessing muscle tone and detecting events like bruxism or other movements. The correct positioning is above and below the chin, creating a configuration that effectively captures the electrical activity of the chin muscles. This dual placement enhances the ability to monitor the activity of the mentalis and other muscles associated with movements that can affect sleep quality and help in diagnosing certain sleep disorders. Placing the electrodes in this manner allows for a clear recording of muscle activity, which can be used to differentiate between various types of behavior that may occur during sleep, including periodic limb movements and other muscle-related disruptions. The other options do not provide the ideal placement for monitoring chin muscle activity. For example, positioning electrodes on the jaw and above the chin may not capture complete data related to both the upper and lower chin muscles. Similarly, the tibialis option is irrelevant, as it pertains to a different muscle group altogether. Hence, above and below the chin is the optimal method for effective EMG monitoring in sleep studies.

10. Which filter settings should be used for recording airflow and respiratory effort?

A. LFF = 10 Hz, HFF = 100 Hz

B. LFF = 1 Hz, HFF = 30 Hz

C. LFF = 0.3 Hz, HFF = 30 Hz

D. LFF = 0.1 Hz, HFF = 0.5 Hz

The correct choice for filter settings when recording airflow and respiratory effort is characterized by a low-frequency filter (LFF) set at 0.1 Hz and a high-frequency filter (HFF) set at 0.5 Hz. This configuration is optimal for respiratory measurements because it allows for the capture of very subtle respiratory signals while effectively minimizing high-frequency noise that could obscure these signals. A low-frequency filter setting of 0.1 Hz is particularly important when assessing airflow because it ensures that even the slowest phases of respiratory cycles are captured accurately. This is critical in sleep studies, where respiration can be very subtle and changes may occur over extended periods. The high-frequency filter setting of 0.5 Hz is sufficient to filter out any unnecessary high-frequency artifacts without compromising the integrity of the respiratory waveforms. This helps in maintaining the clarity and precision of the data, ensuring that the physiological phenomena being monitored are accurately represented. The other options have filters that either cut off too much low-frequency data, which is essential for accurately capturing respiratory effort, or set high-frequency cutoffs that do not adequately filter the relevant noise. Thus, the chosen settings optimize the quality of the airflow and respiratory effort recordings, making them reliable for clinical interpretation and analysis.

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