University of Central Florida (UCF) SPA3011 Speech Science Practice Exam 1 (Sample)

Study Guide

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Questions

1. What happens to the diaphragm during the inspiratory phase of breathing?

   A. It contracts and raises

   B. It relaxes and lowers

   C. It stays in a neutral position

   D. It simultaneously moves in both directions

2. What does IPA stand for in relation to speech samples?

   A. International Phonetic Association

   B. Internal Phonetic Adaptation

   C. Individual Phoneme Analysis

   D. Inferred Phonetic Assessment

3. What is the main purpose of keeping abreast of technological advances in speech science?

   A. To reduce costs in therapy

   B. To enhance communication with clients

   C. To improve therapeutic outcomes

   D. To provide up-to-date therapy techniques

4. Which of the following describes the fundamental frequency average for children?

   A. 150 Hz

   B. 300 Hz

   C. 400 Hz

   D. 250 Hz

5. Voice onset time (VOT) is specifically used to measure which group of consonant sounds?

   A. Fricatives

   B. Nasal Sounds

   C. Stops

   D. Liquids

6. Formant frequencies resonate the loudest at which parts of a vowel?

A. The transient states

B. The steady state portion

C. The initial phases

D. The terminal overlaps

7. Which of the following is a benefit of understanding speech production and perception?

A. To keep abreast of legislation

B. To facilitate L1 acquisition

C. To understand the link between production and perception

D. To establish therapy techniques

8. Which prosodic feature increases due to a rise in subglottal pressure?

A. Pitch

B. Duration

C. Loudness

D. Articulation

9. What percentage of the U.S. population is estimated to be of Hispanic origin by the year 2060?

A. 20%

B. 25%

C. 30%

D. 35%

10. What two conditions must be met for vocal folds to vibrate?

A. They must be adducted and there should be no air pressure

B. They must be abducted and subglottic pressure must be lower

C. They must be adducted and subglottic pressure must be higher than supraglottic pressure

D. They must be relaxed and supraglottic pressure must be higher

Answers

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

Explanations

1. What happens to the diaphragm during the inspiratory phase of breathing?

A. It contracts and raises

B. It relaxes and lowers

C. It stays in a neutral position

D. It simultaneously moves in both directions

During the inspiratory phase of breathing, the diaphragm contracts and moves downward. This contraction increases the volume of the thoracic cavity, allowing air to flow into the lungs due to the decreased pressure created within the thoracic cavity. When the diaphragm contracts, it pulls the central tendon down, which in turn pulls the entire diaphragm dome downward, facilitating the inhalation process. The option stating that the diaphragm relaxes and lowers does not accurately describe what occurs during inspiration; rather, that would pertain to the process of exhalation where the diaphragm relaxes and moves upwards as air is expelled from the lungs. Understanding the mechanics of the diaphragm's movement helps clarify how breathing is facilitated during different phases.

2. What does IPA stand for in relation to speech samples?

A. International Phonetic Association

B. Internal Phonetic Adaptation

C. Individual Phoneme Analysis

D. Inferred Phonetic Assessment

The correct answer refers to the International Phonetic Association, which is the organization responsible for creating the International Phonetic Alphabet (IPA). This alphabet provides a standardized system for representing the sounds of spoken language. Each symbol in the IPA corresponds to a specific sound (or phoneme), allowing for accurate transcription and analysis of speech samples. This uniformity is essential for linguists, speech-language pathologists, and language educators, as it facilitates clear communication regarding pronunciation across different languages and dialects. The other options do not represent recognized terms in the field of phonetics or speech science and do not align with the established understanding of phonetic transcription and its associations.

3. What is the main purpose of keeping abreast of technological advances in speech science?

A. To reduce costs in therapy

B. To enhance communication with clients

C. To improve therapeutic outcomes

D. To provide up-to-date therapy techniques

The main purpose of staying updated on technological advances in speech science is primarily to enhance communication with clients. By being knowledgeable about the latest tools and techniques, clinicians can better explain options and treatment plans, making it easier for clients to understand complex information. Effective communication fosters a stronger therapeutic relationship, allowing clients to feel more engaged and involved in their treatment process. Additionally, being aware of new technologies enables professionals to address the specific needs of their clients more effectively, ensuring that they can use resources that resonate with their clients' preferences and lifestyles. This improved interaction can lead to higher satisfaction, increased adherence to therapy, and a positive impact on the overall therapeutic experience. Although reducing costs, improving outcomes, and providing up-to-date techniques are also valuable considerations, the direct enhancement of communication stands out as a fundamental aspect that significantly influences the success of speech therapy interventions.

4. Which of the following describes the fundamental frequency average for children?

A. 150 Hz

B. 300 Hz

C. 400 Hz

D. 250 Hz

The fundamental frequency is a critical aspect of speech science, representing the lowest frequency of a periodic waveform and often correlating with the perceived pitch of voice. For children, the average fundamental frequency is significantly higher than that of adults due to anatomical differences, such as smaller vocal folds which resonate at higher frequencies. 300 Hz is recognized as a typical fundamental frequency average for children's voices. This higher range is associated with their smaller anatomical structures and differentiates their speech from adults, whose average fundamental frequencies typically fall around 85 Hz to 180 Hz, depending on gender. Therefore, choosing 300 Hz accurately reflects the average pitch of children's voices in speech science. The other options, while they may represent different frequencies, do not align with the established understanding of average fundamental frequencies for children.

5. Voice onset time (VOT) is specifically used to measure which group of consonant sounds?

A. Fricatives

B. Nasal Sounds

C. Stops

D. Liquids

Voice onset time (VOT) is a critical acoustic measurement used to distinguish between voiced and voiceless stop consonants. It refers to the length of time that passes between the release of a stop consonant and the onset of vocal cord vibration. In the case of stops, this timing is essential because it helps to determine if a consonant like /b/ (voiced) or /p/ (voiceless) is being produced. In contrast, fricatives, nasal sounds, and liquids do not exhibit a clear VOT distinction like stops do. Fricatives do not have a definitive release phase; nasal sounds are characterized by resonance in the nasal cavity rather than timing related to voicing onset, and liquids do not have a voice onset time relevancy in the same way that stops do. Thus, VOT is specifically and critically employed in the analysis of stop consonants, making it the correct choice in this context.

6. Formant frequencies resonate the loudest at which parts of a vowel?

A. The transient states

B. The steady state portion

C. The initial phases

D. The terminal overlaps

Formant frequencies, which are key to understanding the acoustic properties of vowels, resonate most strongly during the steady state portion of a vowel. This part of a vowel sound represents a period where the articulatory configuration of the vocal tract is stable, allowing for maximum resonance enhancement of the formant frequencies. During steady states, the configuration of the oral cavity reaches a specific shape, which shapes the resonating frequencies. This is particularly important because the formants are critical for vowel identification and classification in speech. The steady state facilitates the distinct formant patterns that characterize different vowel sounds. In contrast, transient states refer to the rapid changes at the beginning and end of a vowel sound, which do not contribute to the sustained resonant properties of the formants in the same way. The initial phases and terminal overlaps are areas where the speech signal is in transition, typically involving changes in articulatory position or the blending of sounds, thus lacking the necessary stability for resonant peak formation. Therefore, the steady state portion stands out as the critical phase for the loudest resonance of formant frequencies in vowel production, making it the correct answer.

7. Which of the following is a benefit of understanding speech production and perception?

A. To keep abreast of legislation

B. To facilitate L1 acquisition

C. To understand the link between production and perception

D. To establish therapy techniques

Understanding the link between production and perception is crucial because it highlights how these two processes interact and influence one another in the context of speech communication. When individuals produce speech, they rely on their perceptual abilities to monitor and adjust their output. Conversely, auditory perception allows individuals to interpret and make sense of the speech they hear. This relationship is fundamental for various applications, including language development, speech therapy, and improving communication skills. Recognizing the interplay between how sounds are produced and how they are perceived can lead to better strategies for teaching, therapy, and research in speech and language disorders, making this understanding a key benefit in the field.

8. Which prosodic feature increases due to a rise in subglottal pressure?

A. Pitch

B. Duration

C. Loudness

D. Articulation

The correct answer is that loudness increases due to a rise in subglottal pressure. Subglottal pressure refers to the air pressure that is generated below the vocal folds, and it plays a critical role in vocal production. When subglottal pressure increases, the force with which the air pushes through the vocal folds becomes greater. This results in a louder voice because the increased airflow causes the vocal folds to vibrate with more force, enhancing the intensity of the sound produced. In the context of speech, loudness is perceived as the strength or intensity of the sound, and it is closely tied to changes in subglottal pressure. This understanding is fundamental in speech science, as it explains how physical properties of phonation are linked to acoustic output. Other prosodic features, such as pitch, duration, and articulation, are influenced by different mechanisms. For instance, pitch is primarily determined by the frequency of vocal fold vibration, which is more directly affected by tension and mass of the vocal folds rather than subglottal pressure alone. Duration relates to the length of time a sound is produced but is not directly tied to subglottal pressure changes. Articulation involves the movement of speech organs and does not have a

9. What percentage of the U.S. population is estimated to be of Hispanic origin by the year 2060?

A. 20%

B. 25%

C. 30%

D. 35%

The estimate that approximately 30% of the U.S. population will be of Hispanic origin by the year 2060 is derived from demographic studies and projections conducted by the U.S. Census Bureau. This significant increase reflects broader trends in immigration, birth rates, and population dynamics within the Hispanic community. By acknowledging the expected growth in this demographic, the estimate serves to highlight the changing cultural and societal landscape of the United States. These projections take into account factors such as increasing rates of intermarriage, the influence of younger generations, and the overall population growth among Hispanic individuals in various regions of the country. Understanding these dynamics is crucial for addressing the needs and contributions of this growing population segment in areas such as education, healthcare, and policy planning. The choice of 30% is thus supported by extensive research and is indicative of anticipated shifts in the demographic composition of the U.S. over the next few decades.

10. What two conditions must be met for vocal folds to vibrate?

A. They must be adducted and there should be no air pressure

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C. They must be adducted and subglottic pressure must be higher than supraglottic pressure

D. They must be relaxed and supraglottic pressure must be higher

For vocal folds to vibrate, they must be adducted, meaning they are brought together to close the glottis, which is the space between them. This closure is critical as it allows for effective build-up of air pressure beneath the vocal folds, known as subglottic pressure. When this pressure becomes higher than the pressure in the supraglottic area (the space above the vocal folds), the vocal folds are pushed apart. As the air escapes through the glottis and the pressure differences persist, the vocal folds are then forced back together due to the Bernoulli effect—whereas the air flowing between the folds creates a decrease in pressure that draws them closer together. This cycle of opening and closing due to the interplay between the subglottic and supraglottic pressures results in vibration, leading to sound production. The requirement for vocal folds to be adducted ensures that a firm closure is achieved for the efficient generation of sound. The need for the subglottic pressure to be higher than the supraglottic pressure is essential for initiating the periodic opening of the vocal folds necessary for vibration. Together, these two conditions create the fundamental mechanics required for phonation.