

Digital Technician ROC II Practice ATest (Sample)

Study Guide



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Questions

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- 1. What geometric shape is a sine wave based upon?**
 - A. Square triangle**
 - B. Equilateral triangle**
 - C. Right-degree triangle**
 - D. Scalene triangle**
- 2. Which group was formed by the ITU with similar goals to MPEG?**
 - A. Video Coding Expert Group (VCEG)**
 - B. Joint Photographic Experts Group (JPEG)**
 - C. AUDIO-Video coding Expert Group (AVCEG)**
 - D. Audio Video Interleave (AVI)**
- 3. How many bits are in a byte, unless specified otherwise?**
 - A. 4 bits**
 - B. 8 bits**
 - C. 16 bits**
 - D. 32 bits**
- 4. What can be said about disruptive technologies over time?**
 - A. They remain disruptive indefinitely**
 - B. They lose relevance as new technologies emerge**
 - C. They are eventually recognized as innovative**
 - D. They require significant regulatory changes**
- 5. What type of receptors in the retina are sensitive to light?**
 - A. Rods**
 - B. Cones**
 - C. Photoreceptors**
 - D. Color receptors**
- 6. What compressed digital audio format is prevalent in movie soundtracks for its surround sound capabilities?**
 - A. MP3**
 - B. AC-3**
 - C. AAC**
 - D. DTS**

- 7. What technology is plain old telephone service (POTS) built on?**
- A. Packet switching**
 - B. Circuit switching**
 - C. Frame relay**
 - D. Voice over Internet Protocol**
- 8. Which of the following best describes VoIP technology?**
- A. Exclusive to cellular networks**
 - B. Dependent on circuit-switched networks**
 - C. Enables voice communication over Internet Protocol**
 - D. Requires physical telephone lines**
- 9. What role does customer preference play in the evolution of IPTV strategies?**
- A. It is disregarded in favor of legacy systems.**
 - B. It drives the exploration of new integration strategies by operators.**
 - C. It limits the adoption of new technologies.**
 - D. It has no impact on programming choices.**
- 10. How does Trellis coding provide error correction?**
- A. It increases the encryption complexity**
 - B. It adjusts the symbol transitions to a robust set**
 - C. It reduces the data rate**
 - D. It ensures constant signal amplitude**

Answers

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

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Explanations

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1. What geometric shape is a sine wave based upon?

- A. Square triangle**
- B. Equilateral triangle**
- C. Right-degree triangle**
- D. Scalene triangle**

The sine wave is fundamentally based on the properties of a right triangle. In trigonometry, the sine function is defined as the ratio of the length of the side opposite an angle to the length of the hypotenuse in a right triangle. As the angle varies, this ratio creates a smooth, continuous oscillation which is represented visually as a sine wave. The sine wave reflects how this ratio changes as the angle moves from 0 to 90 degrees, allowing the representation of periodic phenomena such as sound waves, light waves, and other types of oscillatory motions. This close relationship with right triangles makes them the correct geometric shape upon which the sine wave is based. The key aspect here is that the sine function is inherently tied to right triangles, allowing their properties to define the wave's characteristics.

2. Which group was formed by the ITU with similar goals to MPEG?

- A. Video Coding Expert Group (VCEG)**
- B. Joint Photographic Experts Group (JPEG)**
- C. AUDIO-Video coding Expert Group (AVCEG)**
- D. Audio Video Interleave (AVI)**

The Video Coding Expert Group (VCEG) was established by the International Telecommunication Union (ITU) with objectives that align closely with those of the Moving Picture Experts Group (MPEG). Both groups aim to develop standards for the compression of video and audio, promoting interoperability and efficient distribution of multimedia content. VCEG focuses specifically on video coding techniques, while MPEG addresses broader multimedia coding standards. The establishment of VCEG reflects a collaborative effort to improve video coding technologies, similar to the mission of MPEG, thus positioning VCEG as a key player in the development of video compression standards. This relationship fosters advancements in multimedia through shared knowledge and technologies between both groups.

3. How many bits are in a byte, unless specified otherwise?

- A. 4 bits**
- B. 8 bits**
- C. 16 bits**
- D. 32 bits**

A byte is a standardized unit of digital information that consists of 8 bits. This standardization is critical in computer science and digital electronics, where bytes serve as the basic building blocks for data representation, including characters in text files, pixel colors in digital images, or numerical data in databases. Understanding that a byte equals 8 bits is foundational for topics ranging from memory allocation to data transmission. This convention is widely accepted across various operating systems, programming languages, and networking standards, making it a fundamental concept in digital technology.

4. What can be said about disruptive technologies over time?

- A. They remain disruptive indefinitely
- B. They lose relevance as new technologies emerge
- C. They are eventually recognized as innovative**
- D. They require significant regulatory changes

Disruptive technologies often begin by challenging the status quo, and over time, they can transition into widely accepted innovations. Initially, these technologies may be met with skepticism or resistance because they fundamentally alter how existing processes or industries operate. However, as their benefits become more apparent and as they demonstrate practical applications, society begins to recognize their transformational potential. This recognition typically leads to greater acceptance and integration into mainstream practices. For example, technologies like the internet and smartphones were once perceived as disruptive innovations but have now become integral to everyday life and business operations. Over time, as these technologies prove their value, they are celebrated not just as disruptors but as essential tools that pave the way for further advancements and improved efficiencies. While there are scenarios where disruptive technologies might lose relevance as newer innovations surface or where they could introduce regulatory challenges, the hallmark of disruptive technologies is their eventual acceptance and acknowledgment as pioneering solutions in their fields.

5. What type of receptors in the retina are sensitive to light?

- A. Rods**
- B. Cones
- C. Photoreceptors
- D. Color receptors

Rods are specialized photoreceptor cells located in the retina that are highly sensitive to light, making them essential for night vision and low-light conditions. They contain a photopigment called rhodopsin, which is particularly effective at absorbing photons of light, allowing rods to function well in dim environments. This sensitivity allows them to detect various degrees of brightness, contributing to our ability to see in low-light situations. In contrast, while cones also serve as photoreceptors and are responsible for color vision and visual acuity in well-lit conditions, they are less sensitive to light than rods. There are three types of cone cells, each sensitive to different wavelengths, which facilitate the perception of colors. However, rods dominate in scenarios involving minimal light. Therefore, when considering which receptors in the retina are primarily sensitive to light, rods are the clear answer.

6. What compressed digital audio format is prevalent in movie soundtracks for its surround sound capabilities?

- A. MP3**
- B. AC-3**
- C. AAC**
- D. DTS**

The prevalent compressed digital audio format in movie soundtracks, particularly recognized for its surround sound capabilities, is AC-3. This format, also known as Dolby Digital, is widely used in cinema and home theater setups for delivering high-quality audio that supports multiple channels. It encodes audio in a way that allows for the transmission of multiple audio tracks, enhancing the immersive experience of films by providing discrete audio channels for various speakers in a surround sound system. AC-3 is specifically designed to handle the complexities of movie audio, such as dialogue clarity, sound effects, and music, in a coherent surround sound environment. This makes it the industry standard for DVD and Blu-ray audio tracks, as well as streaming platforms, ensuring a rich auditory experience that faithfully represents the director's artistic intentions in film audio mixing.

7. What technology is plain old telephone service (POTS) built on?

- A. Packet switching**
- B. Circuit switching**
- C. Frame relay**
- D. Voice over Internet Protocol**

Plain Old Telephone Service (POTS) is built on circuit switching technology. This method establishes a dedicated communication path or circuit between two endpoints for the duration of the call. During a POTS call, this circuit is reserved exclusively for the conversation, allowing for a constant and consistent connection between the caller and recipient, which is key for maintaining voice quality. Circuit switching contrasts with packet switching, where data is broken into packets and sent over a shared network, allowing multiple communications to occur simultaneously but potentially leading to variable delays and packet loss. Technologies like frame relay operate on packet-switched models as well. Voice over Internet Protocol (VoIP) involves digitizing voice signals and sending them over packet-switched networks, which is fundamentally different from the dedicated circuit established by POTS. Understanding the underlying technology helps highlight why POTS provides reliable and low-latency voice communication, as well as its limitations in terms of bandwidth and the inability to transmit data or multimedia effectively.

8. Which of the following best describes VoIP technology?

- A. Exclusive to cellular networks
- B. Dependent on circuit-switched networks
- C. Enables voice communication over Internet Protocol**
- D. Requires physical telephone lines

VoIP, or Voice over Internet Protocol, is a technology that enables voice communication over the Internet. This means that instead of using traditional telephone lines or circuit-switched networks to transmit voice data, VoIP converts the voice signals into digital packets that are then sent over IP networks. This innovative approach allows for more efficient communication, often at a lower cost than conventional phone systems. The technology is inherently flexible, as it can utilize any internet connection, including broadband, without the need for dedicated physical telephone lines. This leads to advantages such as the ability to make calls from various devices, including computers and smartphones, as long as there is an internet connection available. Therefore, describing VoIP technology as enabling voice communication over Internet Protocol captures its core function and the essence of its capabilities effectively.

9. What role does customer preference play in the evolution of IPTV strategies?

- A. It is disregarded in favor of legacy systems.
- B. It drives the exploration of new integration strategies by operators.**
- C. It limits the adoption of new technologies.
- D. It has no impact on programming choices.

Customer preference plays a significant role in shaping IPTV strategies as it drives operators to explore new integration strategies. In a competitive market, understanding what customers want, such as content accessibility, personalized viewing experiences, and the flexibility of platforms, leads operators to innovate and improve their service offerings. By responding to customer preferences, operators can create differentiated experiences that enhance viewer satisfaction and retention. This responsiveness not only helps in understanding what content is in demand but also influences how services are packaged and delivered. As a result, the exploration of new integration strategies becomes essential to meet evolving customer needs while advancing technology and content delivery methods in the IPTV space.

10. How does Trellis coding provide error correction?

- A. It increases the encryption complexity
- B. It adjusts the symbol transitions to a robust set**
- C. It reduces the data rate
- D. It ensures constant signal amplitude

Trellis coding provides error correction by adjusting symbol transitions to create a more robust set of codes that can effectively handle errors during transmission. This technique involves the use of a trellis diagram, which represents the possible states of a system as it encodes data. By mapping data input into a structured format that considers various potential transmission paths, trellis coding can identify and correct errors based on the commonly used paths that were taken. This improves the reliability of the communication by allowing the receiver to decode the received signals, even when some symbols may have been distorted or lost due to noise or interference. The effectiveness of trellis coding lies in its design, which takes advantage of redundancy in transmitted signals. By selecting code sequences that are more likely to remain distinguishable even when errors occur, the system can recover the original information with a higher level of accuracy. This robust nature of symbolic transitions enhances the overall performance of digital communication systems in the presence of noise, making trellis coding a valuable tool for error correction.