EESTX 33303 Wireless Communication Practice Test (Sample)

Study Guide

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Questions

1. **Which of the following is a correct statement about a satellite television antenna?**
   - A. The antenna must have a line of sight to the satellite.
   - B. The antenna can be obstructed by buildings and trees.
   - C. The antenna requires a power source.
   - D. The antenna works better when pointed away from the satellite.

2. **Explain the concept of a 'cell' in a cellular network.**
   - A. A large physical structure housing multiple antennas
   - B. A geographic area covered by a base station, typically divided into smaller sectors
   - C. A type of data packet transmitted over the network
   - D. A type of wireless connection for high-density areas

3. **What does the term "bandwidth" refer to in wireless communication?**
   - A. The physical size of the antenna
   - B. The range of frequencies available for transmission
   - C. The power of the transmitter
   - D. The distance a signal can travel

4. **Communication satellites in geostationary orbit are primarily used for?**
   - A. Personal satellite phones
   - B. Data relay to remote sensors
   - C. Television broadcasting
   - D. Amateur radio communications

5. **The use of wireless LAN equipment normally conforms to _____.**
   - A. IEEE Standard 802.5
   - B. ISO 9001
   - C. IEEE Standard 802.11
   - D. ITU R Standard 1011

6. What technology allows for multiple paths in a network for efficient signal transmission?

A. Point-to-point connection

B. Mesh network

C. Star topology

D. Broadcast method

7. What signal property is adjusted in modulation for effective data transmission?

A. Frequency

B. Amplitude

C. Phase

D. All of the above

8. Which of the following frequency bands is NOT typically used in wireless communication?

A. VHF

B. LF

C. SHF

D. GHF

9. What does the acronym 'ISDN' represent?

A. Integrated Services Data Network

B. Internal Service Digital Network

C. Integrated Services Digital Network

D. Independently Serviced Digital Network

10. In an IEEE 802.11 wireless network, use of the network is controlled by a(n) _____.

A. Network access card

B. Media access protocol

C. Network management system

D. Wireless access protocol

Answers

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

Explanations

1. Which of the following is a correct statement about a satellite television antenna?

A. The antenna must have a line of sight to the satellite.

B. The antenna can be obstructed by buildings and trees.

C. The antenna requires a power source.

D. The antenna works better when pointed away from the satellite.

A satellite television antenna is specifically designed to receive signals from satellites orbiting the Earth. For optimal performance, an unobstructed line of sight to the satellite is essential. This means that there should be no physical barriers, such as buildings, trees, or mountains, blocking the antenna's view of the sky where the satellite is positioned. If the line of sight is obstructed, the signal may be weak or completely lost, resulting in poor picture quality or no reception at all. The requirement for a clear view is critical due to the nature of how satellite signals travel; they are transmitted in a straight line from the satellite to the antenna. This makes it necessary for the satellite dish to be meticulously aimed towards the satellite's location in the sky to receive the transmitted signals effectively. In contrast, other options describe inaccuracies regarding the functionality and requirements of satellite antennas, such as the misunderstandings about obstructions, power needs, and orientation.

2. Explain the concept of a 'cell' in a cellular network.

A. A large physical structure housing multiple antennas

B. A geographic area covered by a base station, typically divided into smaller sectors

C. A type of data packet transmitted over the network

D. A type of wireless connection for high-density areas

In a cellular network, a 'cell' refers to a geographic area that is served by a base station, allowing mobile devices to connect to that station for communication. This area is typically designed to facilitate efficient frequency reuse and manage network traffic. A cell can vary in size, depending on factors such as population density and geographical features, but it is integral to the architecture of the cellular system. Each cell operates on a specific frequency or set of frequencies, which allows multiple cells to operate in proximity without causing interference, as neighboring cells can use the same frequencies at a distance. This structure enables numerous simultaneous users and contributes to the overall capacity of the network. Cells can also be divided into smaller sectors to further enhance capacity and coverage, often resulting in more efficient service and better performance in congested areas. While the other options explore related concepts, they do not accurately depict the definition of a cell. A large physical structure refers more to the base station, and data packets or types of wireless connections pertain to different aspects of communication technology rather than the fundamental concept of a cell itself.

3. What does the term "bandwidth" refer to in wireless communication?

A. The physical size of the antenna

B. The range of frequencies available for transmission

C. The power of the transmitter

D. The distance a signal can travel

In wireless communication, "bandwidth" specifically refers to the range of frequencies that can be used for transmitting data. It quantifies the capacity of a communication channel, indicating how much data can be transmitted over that channel in a given amount of time. Bandwidth is measured in hertz (Hz) and corresponds to the difference between the highest and lowest frequencies in the range. A wider bandwidth allows more data to be sent simultaneously, facilitating faster data transmission rates and better overall communication performance. The other options do not align with the definition of bandwidth. The physical size of the antenna is related to its capability to transmit and receive signals effectively but does not define bandwidth itself. The power of the transmitter pertains to the strength of the signal being sent, affecting how far and effectively a signal can travel but not the frequency range. Similarly, the distance a signal can travel is influenced by various factors like power and environmental conditions, rather than bandwidth directly. Therefore, the definition rooted in the range of frequencies is the fundamental aspect that defines bandwidth in wireless communication.

4. Communication satellites in geostationary orbit are primarily used for?

A. Personal satellite phones

B. Data relay to remote sensors

C. Television broadcasting

D. Amateur radio communications

Communication satellites in geostationary orbit are primarily utilized for television broadcasting due to their unique positioning and characteristics. Geostationary satellites orbit the Earth at a height of approximately 35,786 kilometers, allowing them to maintain a fixed position relative to the Earth's surface. This stationary orbit is crucial for broadcasting as it ensures that the satellite remains aligned with the same geographic area at all times. This constant position allows for consistent communication and signal strength, making it ideal for transmitting television signals to homes and commercial entities without the need for real-time tracking of the satellite by the receiver. The ability to cover a large geographical area enhances the reach of television programming, making it a preferred choice for broadcasters. While personal satellite phones and data relay services can also utilize satellite technology, they often operate with low Earth orbit satellites or other types of satellites that do not require a stationary orbit. Amateur radio communications typically rely on more dynamic forms of communication and are less dependent on geostationary satellites. Thus, the primary function of geostationary satellites in the context of the question is to facilitate reliable television broadcasting.

5. The use of wireless LAN equipment normally conforms to _____.

A. IEEE Standard 802.5

B. ISO 9001

C. IEEE Standard 802.11

D. ITU R Standard 1011

The correct answer is based on the fact that wireless LAN (Local Area Network) technology is governed by the IEEE 802.11 standards. These standards define the protocols for implementing wireless networking in local area networks, covering aspects such as frequency bands, data rates, and modulations used in wireless communications. IEEE 802.11 encompasses various specifications for wireless communication, including the Wi-Fi standards that are widely used today. The context of this answer highlights that the other options refer to different standards or frameworks that do not specifically pertain to wireless LAN technology. For example, IEEE Standard 802.5 relates to token ring network specifications, which are not applicable to wireless LANs. ISO 9001 is a standard for quality management systems, focusing on organizational processes rather than technology standards. ITU R Standard 1011 concerns radio frequency spectrum allocations and is not focused on the protocols for locally connecting devices via wireless networks. Thus, the use of wireless LAN equipment aligns specifically with IEEE Standard 802.11.

6. What technology allows for multiple paths in a network for efficient signal transmission?

A. Point-to-point connection

B. Mesh network

C. Star topology

D. Broadcast method

A mesh network is the correct choice because it is designed to include multiple paths for data transmission between devices. In a mesh network, each node (or device) can connect to multiple other nodes. This connectivity allows for various routes for data to travel, which enhances the network's resilience and efficiency. If one path becomes unavailable or is experiencing high traffic, the data can be rerouted through alternative paths, leading to better performance and reliability. This design contrasts sharply with point-to-point connections, which only facilitate direct links between two devices without redundancy. Likewise, a star topology has a central hub, and if that hub fails, the entire network can go down, limiting the transmission paths. The broadcast method typically involves sending data to all nodes in the network rather than utilizing multiple paths, which does not ensure efficient routing or redundancy like a mesh network does. Therefore, the mesh network's architecture inherently supports multiple pathways for signal transmission, optimizing network performance and reliability.

7. What signal property is adjusted in modulation for effective data transmission?

A. Frequency

B. Amplitude

C. Phase

D. All of the above

In modulation for effective data transmission, all three signal properties—frequency, amplitude, and phase—can be adjusted to encode information onto a carrier signal. Frequency modulation (FM) changes the frequency of the signal in accordance with the data being transmitted. This method is commonly used in radio broadcasting and is effective in providing resistance to noise and signal distortion. Amplitude modulation (AM) varies the amplitude of the carrier signal to represent the data, which is a straightforward approach widely used in applications like AM radio. This method alters the strength of the signal depending on the information being sent. Phase modulation (PM) alters the phase of the carrier signal, allowing for the transmission of data. It can be more complex but enables efficient use of bandwidth and increases data transmission rates. Since modulation can involve adjusting any or all of these properties based on the method and requirements of the communication system, the correct choice encompasses all options. This versatility allows for various modulation schemes to be tailored to different applications and environments, thus facilitating effective data transmission.

8. Which of the following frequency bands is NOT typically used in wireless communication?

A. VHF

B. LF

C. SHF

D. GHF

The correct choice indicates that the GHF band is not recognized as a standard frequency band utilized in wireless communication. In wireless communication, frequency bands are categorized into specific ranges based on their wavelength and applications. VHF (Very High Frequency), LF (Low Frequency), and SHF (Super High Frequency) are all established frequency bands used in various wireless communication technologies. VHF is used for FM radio and television broadcasts, LF is commonly associated with navigation and AM radio, while SHF is widely applied in microwave communication, radar, and satellite communications. In contrast, GHF (Gigahertz Frequency) is not a formally defined frequency band in the context of wireless communication standards. While the term might sound plausible and could imply frequencies in the gigahertz range, there is no recognized band specifically labeled as GHF in standard wireless communication practices. Hence, this makes it the correct response to the question regarding which frequency band is not typically used.

9. What does the acronym 'ISDN' represent?

A. Integrated Services Data Network

B. Internal Service Digital Network

C. Integrated Services Digital Network

D. Independently Serviced Digital Network

The acronym 'ISDN' stands for Integrated Services Digital Network. This term refers to a set of communication standards that enable the digital transmission of voice, video, and data over traditional telephone networks. ISDN was developed to provide a higher quality and more efficient means of communication compared to the older analog systems. The term "Integrated" signifies that ISDN can handle multiple types of services—including voice calls, data transfer, and even video conferencing—over the same digital line. This integration allows for more versatile and reliable communication solutions. In contrast, the other acronyms provided do not accurately represent the established telecommunications standard. They may include terms that hint at digital networking but lack the precise definition that ISDN encompasses. Understanding ISDN is crucial for grasping how digital communication has evolved and how it paved the way for more advanced technologies.

10. In an IEEE 802.11 wireless network, use of the network is controlled by a(n) _____.

A. Network access card

B. Media access protocol

C. Network management system

D. Wireless access protocol

In an IEEE 802.11 wireless network, the use of the network is governed by a media access protocol. This protocol is essential because it dictates how multiple devices share the same communication medium to avoid collisions and manage the transmission of data efficiently. The IEEE 802.11 standards utilize Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA) as their primary media access protocol. This means that devices listen to the channel before transmitting to detect if it is busy, which helps in minimizing data collisions and optimizing the use of the available bandwidth. A media access protocol essentially provides the rules and methods for how devices communicate and coordinate their activities on a shared communication medium, ensuring smooth and reliable operation within the wireless network.