

NCTI Field Tech II to III Practice Exam (Sample)

Study Guide



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SAMPLE

Questions

- 1. What is the channel width for direct sequence spread spectrum (DSSS) and how far apart are their center frequencies spaced?**
 - A. 20 MHz and 4 MHz**
 - B. 22 MHz and 5 MHz**
 - C. 30 MHz and 6 MHz**
 - D. 15 MHz and 2 MHz**
- 2. What types of spread spectrum technology does the FCC specify in the Codes of Federal Regulation?**
 - A. Time Hopping and Direct Sequencing**
 - B. Direct Sequencing Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS)**
 - C. Homogeneous and Heterogeneous systems**
 - D. Microwave and Infrared Systems**
- 3. What antenna type is ideal for a point-to-point network connection between two office buildings?**
 - A. A dipole antenna**
 - B. A parabolic antenna**
 - C. A semidirectional antenna**
 - D. An omnidirectional antenna**
- 4. What type of attack could jeopardize an employee's job by linking network activities directly back to that employee?**
 - A. Active attack**
 - B. Passive attack**
 - C. Injection attack**
 - D. Distributed denial-of-service attack**
- 5. The formula for calculating the area of a circle is?**
 - A. πr^2**
 - B. $2\pi r$**
 - C. r^2**
 - D. πd**

- 6. What term is used to describe a situation in UTP cable where a conductor contacts a grounded conductor?**
- A. Short circuit**
 - B. Ground loop**
 - C. Ground fault**
 - D. Signal interference**
- 7. What is the last step of the basic wireless access point (WAP) setup?**
- A. Configure the network name**
 - B. Apply security**
 - C. Set the channel**
 - D. Connect power supply**
- 8. What is $7 \frac{3}{8}$ divided by $7 \frac{1}{4}$?**
- A. $1 \frac{1}{58}$**
 - B. 1**
 - C. 2**
 - D. $1 \frac{2}{3}$**
- 9. Why is direct sequence spread spectrum (DSSS) the most commonly used type of spread spectrum?**
- A. It has a low implementation cost**
 - B. It operates in the microwave range**
 - C. Its ease of implementation and high data rates**
 - D. It requires minimal infrastructure**
- 10. What does being "active" as a critical thinker entail?**
- A. Listening passively to discussions**
 - B. Sharing opinions without evidence**
 - C. Observing and taking notes relevant to the issue**
 - D. Making conclusions without research**

Answers

SAMPLE

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

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Explanations

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1. What is the channel width for direct sequence spread spectrum (DSSS) and how far apart are their center frequencies spaced?

- A. 20 MHz and 4 MHz
- B. 22 MHz and 5 MHz**
- C. 30 MHz and 6 MHz
- D. 15 MHz and 2 MHz

In direct sequence spread spectrum (DSSS) systems, the channel width and the spacing of center frequencies are important parameters that influence the performance and capacity of the communication system. The correct choice indicates that the channel width is 22 MHz, with the center frequencies spaced 5 MHz apart. DSSS utilizes a spreading code that expands the data signal over a wider bandwidth than the minimum necessary, which helps in minimizing interference and increasing resistance to jamming. A 22 MHz channel width allows for sufficient bandwidth to accommodate the spread spectrum techniques employed, ensuring effective signal transmission with reduced susceptibility to noise. The center frequency spacing of 5 MHz is also significant because it ensures that adjacent channels can operate without causing significant interference with one another, maintaining the integrity of each signal being transmitted. This spacing effectively supports multiple channels in the same frequency band, allowing for higher capacity and better resource utilization. In contrast, the other options provide channel widths and center frequency spacings that do not align with the established norms for DSSS systems. Each of them suggests either a channel width or spacing that is uncommon or not practical for effective DSSS communications, failing to meet the accepted technical standards used in the field.

2. What types of spread spectrum technology does the FCC specify in the Codes of Federal Regulation?

- A. Time Hopping and Direct Sequencing
- B. Direct Sequencing Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS)**
- C. Homogeneous and Heterogeneous systems
- D. Microwave and Infrared Systems

The Federal Communications Commission (FCC) specifies two primary types of spread spectrum technology in the Code of Federal Regulations: Direct Sequencing Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS). Direct Sequencing Spread Spectrum involves spreading the data signal over a larger bandwidth than the minimum required, using a pseudorandom noise code to modulate the signal. This technique helps improve resistance to interference and can provide better security against eavesdropping. Frequency Hopping Spread Spectrum, on the other hand, rapidly switches the carrier frequency among many different frequencies, which makes it more difficult for unauthorized listeners to intercept the signal. This technique contributes to improved reliability and security by reducing the likelihood of interference from jamming or other systems operating on a single frequency. These two technologies are outlined in the regulations due to their significance and efficiency in various communication applications, making them central to the usage and development of wireless communication systems. The other options do not specifically align with the FCC's regulations concerning spread spectrum technology. Homogeneous and heterogeneous systems do not describe spread spectrum techniques but rather refer to the composition of a system in terms of uniformity and diversity. Microwave and infrared systems are types of communication mediums but do not pertain directly to spread spectrum methodologies and

3. What antenna type is ideal for a point-to-point network connection between two office buildings?

- A. A dipole antenna**
- B. A parabolic antenna**
- C. A semidirectional antenna**
- D. An omnidirectional antenna**

In a point-to-point network connection between two office buildings, a semidirectional antenna is the ideal choice. This type of antenna is designed to focus its signal in a specific direction, which enhances the link quality and reduces interference from other directions. By focusing the radio waves, it allows for a clearer and stronger transmission over the distance between the two buildings. Semidirectional antennas can effectively support the long-range connectivity needed in point-to-point scenarios. They help maintain a direct line of sight between the two locations, which is crucial for minimizing signal loss and maximizing bandwidth. This is particularly important in a business environment where reliable and high-speed connectivity is necessary. Other antenna types, such as a dipole antenna, might provide omnidirectional coverage but are not designed for the focused signal required in a long-range point-to-point application. Parabolic antennas, on the other hand, offer even greater directionality and can work extremely well for long distances but may require more precise alignment and may not be suitable for all environments. Omnidirectional antennas send and receive signals equally in all directions, which is beneficial for general coverage but not optimal for targeted communications between two specific points. Therefore, the semidirectional antenna strikes a balance by being sufficiently focused for this type of

4. What type of attack could jeopardize an employee's job by linking network activities directly back to that employee?

- A. Active attack**
- B. Passive attack**
- C. Injection attack**
- D. Distributed denial-of-service attack**

The correct answer involves a passive attack, which is characterized by monitoring or capturing data without actively interacting with the systems. In a passive attack, the attacker observes and logs network traffic, which can reveal sensitive information about users, including their activities, logins, and communications. By linking these observations directly to an employee, a passive attack can result in revealing improper activities or vulnerabilities that may put that employee's position at risk. This type of attack is particularly dangerous because it operates silently, making it difficult for the victim to detect that their activities are being monitored. In contrast, other types of attacks, such as active attacks or injection attacks, involve more overt actions that disrupt normal operations or corrupt data. A distributed denial-of-service (DDoS) attack focuses on overwhelming a network or service, which may cause service interruptions but does not specifically link malicious activities back to an individual employee in a way that endangers their job. Therefore, the nature of a passive attack aligns perfectly with the scenario presented in the question.

5. The formula for calculating the area of a circle is?

- A. πr^2**
- B. $2\pi r$**
- C. r^2**
- D. πd**

The formula for calculating the area of a circle is represented by πr^2 , where "r" stands for the radius of the circle. This formula derives from the fundamental geometric principle that the area of a circle is proportional to the square of its radius. The constant π (pi) represents the ratio of the circumference of the circle to its diameter and is approximately equal to 3.14159. When you apply this formula, you are essentially determining how much space is contained within the boundary of the circle. By squaring the radius, you account for the two-dimensional nature of the area. Therefore, when you plug in the radius value into the formula, you can effectively calculate the total area enclosed by the circle. Other options represent different properties related to circles. For instance, $2\pi r$ is the formula for the circumference of a circle, relating to the distance around it, while πd refers to the same concept, using the diameter instead of the radius. The choice r^2 by itself does not include π and does not accurately represent a circle's area without that specific proportionality constant. Thus, using πr^2 is essential for correctly calculating the area of a circle.

6. What term is used to describe a situation in UTP cable where a conductor contacts a grounded conductor?

- A. Short circuit**
- B. Ground loop**
- C. Ground fault**
- D. Signal interference**

In the context of UTP (Unshielded Twisted Pair) cabling, a situation where a conductor makes contact with a grounded conductor is referred to as a ground fault. A ground fault occurs when electrical current unintentionally flows to the ground due to a fault or breakdown in insulation. This can result in an abnormal condition that may cause equipment damage or safety hazards. The term emphasizes the impact of its occurrence on the electrical system; it specifically indicates that there is an unintended path for the electrical current, which can lead to various operational issues in network performance. Recognizing and addressing ground faults is vital for maintaining the integrity of data transmission and overall system safety. Other terms related to grounding and electrical phenomena, like short circuits or ground loops, while relevant in their contexts, do not precisely describe the scenario of a contact between a conductor and a grounded conductor. A short circuit indicates a direct path that allows current to bypass the expected load, often creating an overload situation, while a ground loop refers to multiple paths to ground causing unwanted current flow, usually resulting in noise or interference in the signal. Signal interference, on the other hand, is a broader term covering various forms of disruption in signal transmission, not specifically related to grounding issues.

7. What is the last step of the basic wireless access point (WAP) setup?

A. Configure the network name

B. Apply security

C. Set the channel

D. Connect power supply

The last step of the basic wireless access point (WAP) setup is to apply security settings. This step is crucial because once the WAP is configured with a network name, channel, and power supply, it serves as the access point for wireless devices to connect to the network. Implementing security measures, such as setting up encryption (like WPA2 or WPA3), creating a strong password, and possibly enabling MAC address filtering, is essential to protect the network from unauthorized access and ensure the integrity of the data being transmitted. While configuring the network name, setting the channel, and connecting the power supply are important initial steps in setting up the WAP, they do not secure the network. Applying security measures at the end of the setup ensures that the WAP is ready for use in a secure manner, minimizing the risk of vulnerabilities that could be exploited by attackers. Therefore, the security step should always be the final action taken before using the WAP to ensure a safe wireless environment.

8. What is $7\frac{3}{8}$ divided by $7\frac{1}{4}$?

A. $1\frac{1}{58}$

B. 1

C. 2

D. $1\frac{2}{3}$

To solve the problem of dividing $7\frac{3}{8}$ by $7\frac{1}{4}$, first, we need to convert these mixed numbers into improper fractions. For $7\frac{3}{8}$: - Multiply the whole number 7 by the denominator 8: $(7 \times 8 = 56)$ - Add the numerator 3: $(56 + 3 = 59)$ - Thus, $7\frac{3}{8} = \frac{59}{8}$. For $7\frac{1}{4}$: - Multiply the whole number 7 by the denominator 4: $(7 \times 4 = 28)$ - Add the numerator 1: $(28 + 1 = 29)$ - Therefore, $7\frac{1}{4} = \frac{29}{4}$. Next, we perform the division of the two improper fractions: $\frac{59}{8} \div \frac{29}{4} = \frac{59}{8} \times \frac{4}{29} = \frac{59 \times 4}{8 \times 29} = \frac{236}{232} = \frac{59}{58} = 1\frac{1}{58}$

9. Why is direct sequence spread spectrum (DSSS) the most commonly used type of spread spectrum?

- A. It has a low implementation cost**
- B. It operates in the microwave range**
- C. Its ease of implementation and high data rates**
- D. It requires minimal infrastructure**

Direct Sequence Spread Spectrum (DSSS) is widely recognized for its ability to facilitate high data rates while maintaining ease of implementation, which is why it is often chosen in various communication systems. The technique works by spreading the signal over a wide frequency band, utilizing a spreading code that increases the signal's bandwidth. This process not only enhances the security of the transmission by making it less susceptible to interception but also enables better resistance to interference and multipath fading, which are common issues in wireless communications. The ease of implementation stems from the availability of compatible technologies and software that simplify the integration of DSSS into existing systems. Furthermore, its capability to support high data rates makes DSSS particularly attractive for applications that require efficient and speedy communication, such as in wireless networking and mobile telecommunications. These combined advantages make it a preferred choice, especially when considering the demands for both performance and reliability in modern communication systems.

10. What does being "active" as a critical thinker entail?

- A. Listening passively to discussions**
- B. Sharing opinions without evidence**
- C. Observing and taking notes relevant to the issue**
- D. Making conclusions without research**

Being "active" as a critical thinker involves engaging with information in a hands-on and thoughtful manner. This means actively observing and taking notes relevant to an issue, which helps in understanding complexities and forming well-rounded perspectives. By making a conscious effort to record pertinent information, a critical thinker can analyze data more effectively, compare various viewpoints, and synthesize their understanding before reaching conclusions. This active engagement allows for deeper comprehension and enables the thinker to connect ideas creatively and logically. Therefore, taking notes and being observant are crucial skills for critical thinking, as they foster an environment in which sound reasoning can flourish.