NCTI Field Tech IV Progression Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

Questions

1. **Which description best fits the copper cabling used to connect homes and businesses to the nearest CO?**

   A. Trunk Lines

   B. Local Loops

   C. Feeder Cables

   D. Drop Lines

2. **What is typically assessed first when troubleshooting network issues?**

   A. Physical connections

   B. Network configurations

   C. Symptoms and error messages

   D. User complaints

3. **Which type of network service operates at the Data Link Layer and is connection-oriented?**

   A. Frame relay

   B. Internet Protocol (IP)

   C. Asynchronous Transfer Mode (ATM)

   D. Ethernet

4. **According to the North American Numbering Plan (NANP), what does the "803" in 803-550-0000 represent?**

   A. Subscriber Number

   B. Area Code

   C. Service Provider Identifier

   D. Country Code

5. **What is the main reason for the creation of IP version 6?**

   A. IPv4 does not provide enough unique addresses

   B. IP version 6 is faster than IP version 4

   C. IPv4 is outdated and no longer supported

   D. IP version 6 reduces network latency

6. **What common voice issue can occur on the PSTN due to network delay?**

   A. Static interference

   B. Echo

   C. Latency

   D. Dropouts

7. **In the context of OSI, what is the primary role of the Network Layer?**

   A. Stream data between applications

   B. Establish and terminate connections

   C. Route data packets between devices

   D. Convert data formats

8. **Which ISDN protocol is used for signaling between networked PBXs?**

   A. ISUP

   B. QSIG

   C. SS7

   D. BSSAP

9. **What is the primary purpose of a Data Link Layer protocol?**

   A. Transmit bits across a physical link

   B. Encrypt data for security

   C. Transmit frames across a physical link

   D. Establish connections

10. **Which DSCP bits can administrators use to define custom DiffServ packet PHBs?**

   A. 0-2

   B. 1-3

   C. 3-5

   D. 2-4

Answers

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

Explanations

1. Which description best fits the copper cabling used to connect homes and businesses to the nearest CO?

A. Trunk Lines

B. Local Loops

C. Feeder Cables

D. Drop Lines

The description "Local Loops" best fits the copper cabling used to connect homes and businesses to the nearest Central Office (CO). The local loop refers to the last mile of connection that directly links an individual customer's premise to the telecommunications carrier's network. This segment is typically composed of copper cabling, which facilitates standard telephone services, DSL internet, and other data services. The local loop plays a crucial role in providing access to various telecommunications services and is pivotal in defining the subscriber's connection to the broader network. This infrastructure ensures that communications are maintained effectively over the copper lines directly into residences and business facilities. In contrast, trunk lines refer to high-capacity links that carry extensive data traffic between central locations; feeder cables connect local loops to distribution points; and drop lines specifically refer to the final segment of the connection that runs from the network or pole to a customer's premises, which is a smaller portion of the overall concept of local loops. Hence, "Local Loops" accurately captures the essence of what connects homes and businesses to the nearest CO.

2. What is typically assessed first when troubleshooting network issues?

A. Physical connections

B. Network configurations

C. Symptoms and error messages

D. User complaints

When troubleshooting network issues, the initial step is often to assess symptoms and error messages. This approach helps to quickly identify the nature of the problem based on observable issues or indicators provided by devices, systems, or users. These clues can significantly narrow down the potential causes of the network malfunction. By understanding the symptoms, such as specific error messages or connectivity problems users are experiencing, technicians can form hypotheses about the underlying issues without needing to dive into configurations or physical connections right away. Recognizing patterns in the errors and messages can direct the troubleshooting process more efficiently, focusing attention on the most likely sources of the issue.   While examining physical connections, network configurations, and user complaints is important in troubleshooting, starting with symptoms and error messages allows for a more informed diagnosis of the problem, increasing the likelihood of a quick resolution.

3. Which type of network service operates at the Data Link Layer and is connection-oriented?

A. Frame relay

B. Internet Protocol (IP)

C. Asynchronous Transfer Mode (ATM)

D. Ethernet

The correct answer is Frame Relay, which is a data link layer protocol designed for connecting devices on a wide area network (WAN). Being connection-oriented means that Frame Relay establishes a virtual circuit or logical connection before data transfer begins. This allows it to maintain the state of the connection, providing more reliable communication by confirming that data is being sent and received in the correct order, which is crucial for certain applications. Within the context of the Data Link Layer, Frame Relay encapsulates frames with the necessary addressing and control information required for reliable transmission over the network. It uses local area network techniques in a WAN environment, effectively managing how data is transported between devices. In contrast, the other options do not fulfill both criteria of operating at the Data Link Layer and being connection-oriented. Internet Protocol (IP) operates at the Network Layer and is inherently connectionless, as it does not establish a dedicated end-to-end connection. Asynchronous Transfer Mode (ATM) is a cell-based switching technology that operates at both the Network Layer and Data Link Layer but is not considered typically connection-oriented in the sense that it can also function in a connectionless manner. Ethernet, on the other hand, is primarily a connectionless service that operates at the Data Link Layer and does not establish

4. According to the North American Numbering Plan (NANP), what does the "803" in 803-550-0000 represent?

A. Subscriber Number

B. Area Code

C. Service Provider Identifier

D. Country Code

In the context of the North American Numbering Plan (NANP), the "803" in the format 803-550-0000 designates an area code. Area codes are three-digit numbers that serve the purpose of identifying specific geographical regions for telephone services. They are essential for routing calls to the correct regions within North America, ensuring that the telephone system can efficiently manage the large number of phone numbers in use. In this instance, 803 is specifically the area code for parts of South Carolina, indicating that phone numbers with this area code are connected to that geographical location. It is distinct from other components of the phone number, such as the subscriber number, which is the individual phone line associated with a specific account. Understanding area codes is crucial for proper call routing and telecommunications regulation in the NANP.

5. What is the main reason for the creation of IP version 6?

A. IPv4 does not provide enough unique addresses

B. IP version 6 is faster than IP version 4

C. IPv4 is outdated and no longer supported

D. IP version 6 reduces network latency

The primary reason for the creation of IP version 6 (IPv6) is rooted in the limitations of IPv4, particularly regarding the number of unique addresses it can provide. IPv4 utilizes a 32-bit addressing scheme, which allows for approximately 4.3 billion unique addresses. As the internet grew and the number of devices connected to it skyrocketed, it became glaringly evident that this address space would soon be exhausted. IPv6, on the other hand, employs a 128-bit addressing scheme, vastly expanding the number of available addresses to about 340 undecillion (3.4×10^{38}). This immense increase not only accommodates current needs but also anticipates future growth in internet-connected devices. Hence, the development of IPv6 was fundamentally driven by the need to ensure an adequate supply of unique addresses for the ever-expanding global network.   While faster transmission speeds and reduced latency may be potential benefits of IPv6, the primary motivation behind its development was to address the limitations of address availability inherent in IPv4.

6. What common voice issue can occur on the PSTN due to network delay?

A. Static interference

B. Echo

C. Latency

D. Dropouts

The common voice issue that can occur on the PSTN (Public Switched Telephone Network) due to network delay is echo. Echo happens when a person's voice is transmitted across a network and then reflected back to them, often due to latency in the network.   When there's a delay in the transmission of voice signals, the speaker may hear their own voice delayed by several hundred milliseconds or more. This can occur when the voice is sent along a longer route to reach its destination, or when the signals are being processed and converted through different network technologies. The delay creates an overlap, causing the speaker to hear an echo of their own voice. Understanding this phenomenon is crucial for troubleshooting and improving communication quality over any telephony system utilizing the PSTN. Other issues such as static interference, latency, and dropouts may affect voice quality but are distinct from the echo effect that's specifically linked to network delay.

7. In the context of OSI, what is the primary role of the Network Layer?

A. Stream data between applications

B. Establish and terminate connections

C. Route data packets between devices

D. Convert data formats

The primary role of the Network Layer in the OSI model is focused on routing data packets between devices across different networks. This layer is responsible for determining the best path for data to travel from the source to the destination, taking into account factors such as network topology, routing protocols, and network conditions.   This layer uses logical addressing, typically through IP addresses, to identify devices on the network. It performs functions such as packet forwarding, which is essential for successful data communication over complex network structures. By managing how data is sent from one network to another, the Network Layer plays a crucial role in enabling different networks to communicate effectively.   In contrast, other layers have distinct functions: the Transport Layer is concerned with streamlining data between applications and ensuring reliable data transfer; the Session Layer manages the establishment and termination of connections; and the Presentation Layer is responsible for converting data formats for application compatibility. Thus, the focus of the Network Layer on routing data makes it an essential component of the OSI model.

8. Which ISDN protocol is used for signaling between networked PBXs?

A. ISUP

B. QSIG

C. SS7

D. BSSAP

The signaling protocol used for communication between networked Private Branch Exchanges (PBXs) is QSIG. This protocol is specifically designed for interconnecting these systems, allowing them to exchange call control and signaling information effectively. QSIG supports various advanced telecommunication features, making it suitable for businesses that operate multiple PBXs needing seamless communication. The other choices serve different purposes; for instance, ISUP (Integrated Services Digital Network User Part) is primarily used for signaling in circuit-switched networks, specifically for establishing and managing telephone calls. SS7 (Signaling System No. 7) is a set of protocols for exchange signaling between elements in the public switched telephone network and, while it can be involved in overall telecommunications signaling, it is not specifically tailored for PBX-to-PBX communication. BSSAP (Base Station Subsystem Application Part) is primarily related to mobile communication networks and does not apply to signaling between PBXs.   Thus, QSIG is distinctly pivotal in facilitating effective signaling between networked PBXs.

9. What is the primary purpose of a Data Link Layer protocol?

    A. Transmit bits across a physical link

    B. Encrypt data for security

    C. Transmit frames across a physical link

    D. Establish connections

The primary purpose of a Data Link Layer protocol is to transmit frames across a physical link. The Data Link Layer is responsible for node-to-node data transfer and provides the necessary framing, addressing, and error detection/correction mechanisms needed to ensure that data packets can be properly shared between devices over a network medium. This layer ensures that data is organized into frames, which includes not only the payload but also header information that indicates the source and destination addresses, along with control information like error detection codes. This focus on framing and transmission distinguishes the Data Link Layer from other layers. For instance, while the Physical Layer deals strictly with the raw bits being sent over a medium, the Data Link Layer packages these bits into frames that enable more advanced networking features. The Data Link Layer also plays a crucial role in ensuring the reliability and proper sequencing of data frames as they traverse the physical medium.

10. Which DSCP bits can administrators use to define custom DiffServ packet PHBs?

    A. 0-2

    B. 1-3

    C. 3-5

    D. 2-4

The correct answer involves understanding the Differentiated Services Code Point (DSCP) and its role in defining Per-Hop Behaviors (PHBs) in network traffic management. The DSCP field is part of the IP header and consists of 6 bits. When administrators seek to define custom PHBs, they utilize specific bits within the DSCP. The bits that are used for this purpose traditionally are bits 3-5, which provide room for administrators to create various traffic classes. This means that any PHB customization falls within the range of these bits, enabling differentiated handling of packets in a network. Traffic can be prioritized based on these defined behaviors, allowing for more efficient network management and performance optimization. Designing custom PHBs utilizes these bits because they help ensure broader compatibility and adherence to the Differentiated Services architecture without conflicting with existing standards and values already utilizing other bits. The remaining choices do not fall within the correct bit range or do not align with how administrators typically manage and implement custom behaviors effectively.