2.5.9 Practice Questions

Candidate: Keith Hibbard (hibbarkm@miamioh.edu)
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Score: 100%   Passing Score: 80%

Question 1.   ✓ Correct

Which of the following are true about Gigabit Ethernet? (Select two.)

→ ☑ Uses CSMA/CD

  ☐ Uses CSMA/CA

  ☐ Requires fiber optic

  ☐ Uses polling

→ ☑ Can use both copper and fiber optic

Explanation

Gigabit Ethernet is very similar to Fast Ethernet. It uses Carrier Sense, Multiple Access/Collision Detection as the media access method. It can use both copper and fiber optic cables.

References

▶ **2.5.2 Network Access (CSMA/Cx)**

📄 **2.5.3 Ethernet Architecture Facts**

▶ **6.2.1 Static vs. Dynamic Routing**

📄 **6.2.2 Static vs. Dynamic Routing Comparison**

▶ **10.1.1 WAN Overview**

📄 **10.1.2 WAN Type Facts**

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✓ Correct

What is the *backoff* on an Ethernet network?

○   A signal that a collision has occurred.

○   A way to identify the maximum size of a data segment within a packet.

○   A process that prevents collisions from occurring.

→ ○   The random amount of time a device waits before retransmitting after a collision.

Explanation

When a collision occurs on an Ethernet network, sending devices wait a random amount of time before retransmitting. This is called the backoff. Transmitting devices use a jam signal to indicate that a collision has occurred. The backoff cannot completely prevent collisions, although it does help to prevent multiple consecutive collisions.

References

▶ **2.5.2 Network Access (CSMA/Cx)**

📄 **2.5.3 Ethernet Architecture Facts**

▶ **6.2.1 Static vs. Dynamic Routing**

📄 **6.2.2 Static vs. Dynamic Routing Comparison**

▶ **10.1.1 WAN Overview**

📄 **10.1.2 WAN Type Facts**

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Which of the following mechanisms are used on Ethernet networks to control access to the transmission medium? (Select two.)

- ☐ Token

- ☐ Collision avoidance

- ☐ Request to send/clear to send (RTS/CTS)

→ ☑ Backoff

→ ☑ Collision detection

- ☐ Polling

Explanation

Ethernet networks use Carrier Sense, Multiple Access/Collision Detection (CSMA/CD) for controlling access to the transmission medium. A device first listens to the transmission medium to see if it is free. If it is, it starts to transmit. When a collision occurs, the device that detected the collision sends a jam signal. Any device that was trying to send waits a random period of time (called a backoff) before attempting to retransmit.

Collision avoidance is used on wireless networks. Collision avoidance uses Request to send/clear to send (RTS/CTS) messages to determine when to use the transmission medium.

A token is used on token ring networks; only the device with the token is able to transmit. Polling is a media access control method that uses a central device that regularly grants permission to other devices to use the transmission medium.

References

🎞 **2.5.2 Network Access (CSMA/Cx)**

📄 **2.5.3 Ethernet Architecture Facts**

🎞 **6.2.1 Static vs. Dynamic Routing**

📄 **6.2.2 Static vs. Dynamic Routing Comparison**

🎞 **10.1.1 WAN Overview**

📄 **10.1.2 WAN Type Facts**

Question 4. ✓ Correct

What is the first thing that happens when a collision occurs on an Ethernet network?

○ A device that wants to send data sends a request to send (RTS) message.

○ All devices wait a random amount of time before trying to retransmit.

→ ◉ The device that detected the collision transmits a jam signal.

○ All devices that were sending data transmit a clear to send (CTS) message.

○ Devices listen to the medium before trying to retransmit.

Explanation

When a collision occurs on an Ethernet network:

1. The device that detected the collision transmits a jam signal.
2. All devices wait a random period of time before attempting to retransmit.
3. After the time interval has expired, a device will listen to the transmission medium, then transmit if it is free.

Collision avoidance uses Request to send/clear to send (RTS/CTS) messages to determine when to use the transmission medium.

References

⊞ **2.5.2 Network Access (CSMA/Cx)**

⊟ **2.5.3 Ethernet Architecture Facts**

⊞ **6.2.1 Static vs. Dynamic Routing**

⊟ **6.2.2 Static vs. Dynamic Routing Comparison**

⊞ **10.1.1 WAN Overview**

⊟ **10.1.2 WAN Type Facts**

Which of the following is true of CSMA/CD? (Select two.)

→ ☑ A device with data to send first listens to the transmission medium to determine whether it is free.

☐ After a collision, sending devices run the same algorithm before sending their messages again.

☐ Only devices with information to send have access to the transmission media.

→ ☑ If collisions are detected, an interrupt jam signal is broadcast to stop all transmissions.

☐ Two devices can transmit at the same time without collisions occurring.

Explanation

CSMA/CD has the following characteristics:

1. Because all devices have equal access to the transmission media (multiple access), a device with data to send first listens to the transmission medium to determine whether it is free (carrier sense).
2. If the transmission medium is not free, the device waits a random time and listens again. When the transmission medium is free, the device transmits its message.
3. If two devices transmit at the same time, a collision occurs. The sending devices detect the collision and sends a jam signal.
4. Both devices wait a random length of time before attempting to resend the original message. This is called a backoff.

References

📹 **2.5.2 Network Access (CSMA/Cx)**

📄 **2.5.3 Ethernet Architecture Facts**

📹 **6.2.1 Static vs. Dynamic Routing**

📄 **6.2.2 Static vs. Dynamic Routing Comparison**

📹 **10.1.1 WAN Overview**

📄 **10.1.2 WAN Type Facts**

Question 6. ✓ Correct

Which two of the following statements accurately describe full-duplex Ethernet? (Select two.)

☐ It uses 75% of the available bandwidth for actual signal transmission.

☐ It uses built-in loopback and collision detection.

→ ☑ It uses direct point-to-point connections between the sender and receiver.

→ ☑ It is collision-free.

☐ It multiplexes signals along the same wire for higher transmission speeds.

Explanation

Full-duplex Ethernet uses dedicated point-to-point connections and separate circuits for sending and receiving data, so there can be no collisions. Because it is collision-free, it can use 100% of the available bandwidth for data transmission.

Half-duplex Ethernet uses a single cable for both sending and receiving, so it must be able to detect and recover from collisions. Due to possible collisions, transmission speeds and available bandwidth are reduced.

References

📄 **2.5.4 Half and Full Duplex Facts**

🖥 **11.7.1 Troubleshoot Switches**

📄 **11.7.2 Interface Status Troubleshooting Facts**

📄 **11.7.3 VLAN and Trunking Troubleshooting Facts**

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Which two of the following statements accurately describe half-duplex Ethernet? (Select two.)

→ ☑ It uses collision detection and recovery.

☐ It uses direct point-to-point connections between the sender and receiver.

☐ It does not require collision detection.

→ ☑ It sends both signals along the same wire.

☐ It lets you use 100% of the available bandwidth for data transmission.

Explanation

Half-duplex Ethernet uses a single cable for both sending and receiving, so it must be able to detect and recover from collisions. Because of possible collisions, it can use only 50-60% of the available bandwidth for data transmission. Devices with collision detection turned on require half-duplex.

Full-duplex Ethernet uses dedicated point-to-point connections and separate circuits for sending and receiving data, so there can be no collisions. Because it is collision free, it can use 100% of the available bandwidth for data transmission.

References

📄 **2.5.4 Half and Full Duplex Facts**

🖥 **11.7.1 Troubleshoot Switches**

📄 **11.7.2 Interface Status Troubleshooting Facts**

📄 **11.7.3 VLAN and Trunking Troubleshooting Facts**

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Match each Ethernet frame component with its description.

A set of alternating ones and zeros terminated by two ones (11).

> ✓   Preamble

Information that needs to be transmitted from one host to the other.

> ✓   Packet

Verifies that the frame contents arrived uncorrupted.

> ✓   Frame Check Sequence

Identifies the receiving host's MAC address.

> ✓   Destination address

Junk data required to make 64 bytes.

> ✓   Pad

Identifies the sending host's MAC address.

> ✓   Source address

Specifies the Network/Internet layer protocol being used.

> ✓   Type

Explanation

The preamble is a set of alternating ones and zeros terminated by two ones (11), which mark it as a frame.

The destination address identifies the receiving host's MAC address.

The source address identifies the sending host's MAC address.

The type field is two bytes and specifies the Network/Internet layer protocol being used.

The packet or data contains the information that needs to be transmitted from one host to the other.

Ethernet frames are 64 to 1518 bytes in size. If the frame is smaller than 64 bytes, the sending NIC places junk data in the pad to make it the required 64 bytes.

The FCS helps verify that the frame contents have arrived uncorrupted using a cyclic redundancy check (CRC), which is a mathematical calculation performed on the frame.

References

📄 **2.5.6 Ethernet Frame Format Facts**

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✓ **Correct**

What is the maximum cable length for UTP Ethernet T implementations?

- ○ 10 kilometers
- → ◉ 100 meters
- ○ 40 kilometers
- ○ 300 meters

Explanation

The maximum cable length for UTP Ethernet T implementations is 100 meters for all standards.

References

▶ **2.3.1 Network Design Overview**

▶ **2.3.2 Cables and Connectors**

📄 **2.3.3 Twisted Pair Facts**

📄 **2.3.4 Fiber Optic Facts**

▶ **2.5.7 Ethernet Standards**

📄 **2.5.8 Ethernet Standards Facts**

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Question 10. ✓ **Correct**

As specified in the Ethernet standards, what is the maximum number of hosts supported on a single subnet?

- ○ 254
- ○ 100
- ○ 512
- → ◉ 1024

Explanation

Ethernet standards support a maximum of 1024 hosts on a single subnet.

References

▷ **2.3.1 Network Design Overview**

▷ **2.3.2 Cables and Connectors**

▤ **2.3.3 Twisted Pair Facts**

▤ **2.3.4 Fiber Optic Facts**

▷ **2.5.7 Ethernet Standards**

▤ **2.5.8 Ethernet Standards Facts**

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