Cisco CCNA - Quiz Questions with Answers

1.0 Network Fundamentals

1.

How does a switch prevent flooded frames from looping indefinitely?

STP

VLANs

OSPF

RIPv2

Correct answer: STP

The Spanning Tree Protocol (STP) is used to prevent looping of flooded frames. It makes sure that there is only one active path between any pair of LAN segments.

VLANs break a physical network into multiple logically segmented networks. A MAC address table is used by a switch to keep track of which devices are on which ports. Open shortest path first (OSPF) is a routing protocol to calculate the best routes to subnets. Routing Information Protocol v2 (RIPv2) is a routing protocol that uses hop count as a metric.

2.

When using an AP to support multiple SSIDs, which three aspects of the AP remain the same for each BSS? (Choose three.)

- **Channel**

- **BSA**

- **Transmitter**

- Password

- SSID

A single access point (AP) can have multiple VLANs mapped to multiple SSIDs. When doing this, all basic service sets (BSSs) of the AP use the same channel, cover the same geographic area of the basic service area (BSA), and utilize the same hardware, such as the receiver, transmitter, and antenna.

Each BSS will have its own SSID and password for users to connect to, and the BSSID will be unique, with each one having its last digit incremented.

3.

Which statement is true about TCP?

It has error-recovery features.

It is used for multicast network transmissions.

It is used for broadcast network transmissions.

It requires a two-way handshake.

Correct answer: It has error-recovery features.

TCP is used for reliable connections, so it has error-checking features in case packets are not delivered.

UDP is used for multicast and broadcast network transmissions. TCP uses a three-way handshake rather than a two-way handshake.

4.

Which statement is true of an Ethernet point-to-point network?

Each link works independently of other links.

It only uses CSMA/CD.

It is half duplex.

It does not allow a device to send and receive at the same time.

Correct answer: Each link works independently of other links.

An Ethernet point-to-point network describes a network that uses switches so that each point-to-point connection is independent. This is in contrast to an Ethernet shared media network, which uses hubs and shares bandwidth amongst connected nodes.

5.

Which type of IPv6 address is used with the Neighbor Discovery Protocol?

Link local

Unique local

Global unicast

Multicast

Correct answer: Link local

Link local addresses are used for automated functions like Stateless Auto-Configuration and Neighbor Discovery Protocol. The Neighbor Discovery Protocol has functionality similar to ICMP and ARP in IPv4.

A unique local address is an address within a site that is not for routing on the Internet. A global unicast address is a public address that is routable on the IPv6 Internet. A multicast address is a method for transmitting data to a group of interfaces.

6.

Which layer of the OSI model are TCP and UDP?

Transport

Physical

Network

Data Link

Application

Correct answer: Transport

TCP and UDP are protocols in the transport layer. TCP is for creating connections while UDP is for connectionless communication.

The physical layer includes hardware like cables and interface cards. The network layer includes protocols like IP and ICMP. The data link layer includes Ehternet and PPP. The application layer includes protocols like HTTP and SMTP.

7.

Which two sentences describe link-local multicast addresses? (Choose two.)

> **They begin with FF02**

> **They are an address that devices apply a link-local scope to**

> They begin with FE80

> They exist in both IPv4 and IPv6

Link-local multicast addresses start with FF02 as the first quartet. They are a reserved multicast address that devices apply a link-local scope to.

A link-local address starts with FE80. Link-local addresses are unique to IPv6.

8.

Which three statements are true about WPA3? (Choose three.)

> **It can handle authentication with pre-shared keys.**

> **It supports authentication with 802.1x.**

> **It uses encryption and MIC with AES and GCMP.**

> It utilizes CCMP.

> It integrates encryption with TKIP.

Wi-Fi Protected Access 3 (WPA3) is the latest version of WPA. It improves upon WPA2 by using GCMP rather than CCMP and the deprecated TKIP. It supports two authentication methods: pre-shared keys and 802.1x.

9.

Which two of the following are components of PoE? (Choose two.)

PSE

PD

PCP

PAT

Power over Ethernet (PoE) requires Power Sourcing Equipment (PSE), such as a compatible LAN switch, and a Powered Device (PD) that connects to it.

Priority Code Point (PCP) is part of an Ethernet header used with QoS. Port Address Translation (PAT) is used to map multiple devices to a single public IP address.

10.

On a host with several networked VMs, what does each vNIC typically connect to?

Virtual switch

NIC

Container

Router

Hypervisor

Correct answer: Virtual Switch

A virtual network interface card (vNIC) on a virtual machine (VM) that is in a virtual network within its host system will connect to a virtual switch. The virtual switch can then connect to the host's physical NIC.

The vNICs for the networked VMs will not connect directly with the NIC. A container is an application and its dependencies bundled together for easy deployment and scaling. A router is contacted when data needs to be forwarded to an external network. A hypervisor mangers the VMs.

11.

A switch has forwarded a frame to multiple different ports. This cannot be which of the following types of frames?

Known unicast frame

Unknown unicast frame

Broadcast frame

Multicast frame

Correct answer: Known unicast frame

If a frame has a destination address in the switch's MAC address table, then the frame is only forwarded to that port.

An unknown unicast frame will be sent to all ports except the originating one because the switch does not know the destination port. Broadcast and multicast frames are sent to all other interfaces.

12.

Which two statements are true about anycast addresses? (Choose two.)

> **Two different routers can configure the same anycast address.**

> **When a host wants to connect with an anycast address, they send a unicast message.**

> Anycast addresses only work in IPv4.

> An anycast address is used to send a single packet to multiple devices

An anycast address can be configured on many different routers. Hosts will send a unicast message to the address, and a router will route it to the nearest anycast address.

Anycast addresses only work with IPv6. A multicast address is used to send a single packet to multiple devices that subscribe to the address.

13.

In a spine-leaf network, how can an endpoint increase capacity and redundancy?

Connect to two or more leaf switches

Connect to two or more spine switches

Connect to one leaf switch and one spine switch

Connect to adjacent endpoints

Connect to a UCS server

Correct answer: Connect to two or more leaf switches

In a spine-leaf network, endpoints can only connect to leaf switches, and not spine switches or other endpoints like desktops or servers. By connecting to more than one leaf switch, an endpoint can achieve redundancy and increased capacity.

14.

In a two-tier LAN topology, which term describes the links between access switches and distribution switches?

Partial mesh

Star

Full mesh

Hybrid

Bus

Correct answer: Partial mesh

In a two-tier LAN design, a partial mesh of links is typically used between access and distribution switches. This provides a reasonable and cost-effective level of redundancy.

A star topology is represented in the links between a switch and end users. A full mesh topology has each node connected directly to every other node. A hybrid topology combines multiple topology types. A bus topology has each node connected to one cable.

15.

Which command is used to change the default time for a switch to remove entries in its MAC address table?

mac address-table aging-time

show mac address-table aging-time

clear mac address-table dynamic

show interface status

Correct answer: mac address-table aging-time

The correct command for changing the aging-time is "mac address-table aging-time." The aging time can be changed globally or per-VLAN.

The command show mac address-table aging-time will display the default aging time. The command clear mac address-table dynamic will remove dynamic entries from the MAC address table. The command show interface status shows line-by-line the status and operating information for each interface.

16.

In a three-tier LAN design, what is the middle layer called?

Distribution

Access

Core

Collapsed core

Correct answer: Distribution

The middle layer in a three-tier LAN design in the distribution layer. It is an aggregation point for access switches and does not connect directly with end users.

The access layer is the first layer that connects directly with end users. The core layer connects distribution switches. A collapsed core is when the core and distribution layers are together.

17.

Which three features are part of an STP cable? (Choose three.)

Twisted pairs

Foil shield

Braided shield

Core

Cladding

A shielded twister pair cable (STP) is used to protect from interference. It is composed of twisted pairs, a foil shield, a braided shield, and an outer jacket. A fiber cable uses a core and cladding.

18.

When generating a unique interface ID using modified EUI-64, which bit is inverted in the last step?

7th

1st

2nd

6th

8th

Correct answer: 7th

The 7th bit of the interface ID is inverted in the last step of generating a unique interface ID. Inverting the bit by hand involves converting the hexadecimal to binary for the conversion and then converting back again.

19.

What type of interface or cable issue would likely occur due to electrical interference?

Errors

Duplex issues

Increased collisions

Speed mismatch

Correct answer: Errors

Electrical interference can lead to errors when sending and receiving packets. Each packet has a Frame Check Sequence (FCS) that is used to catch errors.

Duplex issues can occur when a full-duplex (switch) area of the network interacts with a half-duplex (hub) area.

Increased collisions occur if there are too many busy nodes on a network.

A speed mismatch can occur if there is older equipment on the network.

20.

Which three parameters can be used when removing dynamic entries from a MAC address table? (Choose three.)

> **VLAN**

> **MAC address**

> **Interface**

> IP address

When clearing entries from the MAC address table, it can be done by VLAN, interface, or MAC address. Clearing without parameters will remove all entries. Clearing entries is an enable-mode command.

21.

According to IEEE 802.11 terminology, what do you call a device connected to a wireless network?

> **STA**

> BSS

> SSID

> BSSID

Correct answer: STA

Any device capable of using the 802.11 wireless protocol is called a station (STA). This can include laptops, smartphones, and access points (APs).

A basic service set (BSS) is a closed area including an AP and connected devices. A service set identifier (SSID) is the human-readable, non-unique name of a wireless network. A basic service set identifier (BSSID) is a unique identifier for an AP.

22.

Why are private IPv4 addresses needed?

Because there are not enough public IPv4 addresses

Because some network traffic shouldn't leave the corporate WAN

Because they define the difference between the corporate LAN and WAN

Because legacy systems can only handle private IPv4 addresses

Correct answer: Because there are not enough public IPv4 addresses

There are not enough IPv4 addresses to accommodate all the devices that connect to the Internet. Therefore, Network Address Translation (NAT) is used to allow for private networks to connect behind a single public IP address.

The other answer choices are not related to IP addressing.

23.

Which range of electromagnetic radiation is categorized as radio frequencies?

3 kHz to 300 GHz

0 hz to 20 hz

20 hz to 20,000 Hz

3 GHz to 400 THz

10^{16} to 10^{20} Hz

Correct answer: 3 kHz to 300 GHz

The radio frequency range is 3 kHz to 300 GHz. It includes radio, microwave, radar, television, and wireless communications.

The subsonic range is 0 to 20 hz, while 20 hz to 20000 Hz is the audio frequency range, and 3 GHz to 400 THz is the infrared range. The X-ray range is 10^{16} to 10^{20} Hz.

24.

What three features are part of a Cisco NGIPS that are not part of a traditional IPS? (Choose three.)

> **AVC**

> **Contextual awareness**

> **Reputation-based filtering**

> Stateful packet inspection

> Event logging

A Cisco next-generation intrusion protection system (NGIPS) has several features that address deficiencies of a traditional IPS. One feature is Application Visibility and Control (AVC), which looks into the application layer rather than just ports and addresses. Another feature is contextual awareness, which means it knows the operating systems, applications, and other details of hosts the NGIPS protects. Reputation-based filtering is another feature, and it considers the known reputation of domains and IP addresses that try to make connections.

Stateful packet inspection and creating logs of events are parts of a traditional IPS.

25.

A switch receives a frame from one of its interfaces that has a destination address, which is not in the switch's MAC address table. Subsequently, the switch forwards the frame to all other interfaces. Which process is being described in this situation?

Frame flooding

Frame switching

MAC learning

MAC aging

Correct answer: Frame flooding

In frame flooding, a frame is forwarded to all interfaces except for the originating one. This occurs with broadcast frames and unknown unicast frames.

Frame switching involves sending a frame to a port based on its known address. MAC learning is the process of dynamically adding MAC addresses to the MAC address table based on the source address of a frame. MAC aging is the process of a MAC address expiring from a MAC address table.

26.

Which two of the following are modified EUI-64 addresses? (Choose two.)

> **368c:b6f0:4dca:ef9d:98da:64ff:fe93:ed00**

> **48d3:ee98:2893:e58f:eabf:aeff:fea1:fa2e**

> 3cc7:739e:b9c1:76ff:ee9d:8943:56d1:9739

> c40e:9fa4:00f6:6cb9:b9e4:377d:70f7:6b63

A modified EUI-64 address is derived from a device's MAC address. This type of address can be recognized because it has the hexadecimal characters fffe between the first and second half of the MAC address.

27.

Which two of the following are common features in APs used to manage access to the wireless network? (Choose two.)

> **Captive portal**

> **ACL**

> Clustering

> NAT

A captive portal requires users to agree to terms before using an AP and limits their access. An access control list (ACL) is a set of rules that can manage users of the AP.

Clustering is a feature that allows several APs to be treated as a unified entity for management purposes. A network address table (NAT) translates between public and private IP addresses.

28.

Which feature of an NGFW protects against attackers that are trying to evade a firewall by using non-standard ports?

> **AVC**

> Traditional firewall features

> Advanced Malware Protection

> URL filtering

Correct answer: AVC

Application Visibility and Control (AVC) is a feature that lets a next-generation firewall (NGFW) inspect the application layer. This is useful for attacks that use random port numbers because traditional firewalls do not look at the application layer.

Traditional firewall functionality is a feature of NGFWs that includes stateful filtering, NAT, and VPN termination. Advanced Malware Protection can block suspicious file transfers. URL filtering is a feature that looks at web requests and checks the URL's reputation score.

29.

Which network device should be used for sending traffic to the WAN?

Router

Bridge

Switch

Hub

Correct answer: Router

A router links networks together—including connecting to the corporate WAN—and operates at Layer 3 using IP addresses to determine the best way for a packet to be forwarded.

A bridge uses a MAC address on Layer 2 of the OSI model. An unmanaged switch uses MAC addresses and operates at Layer 2. A hub is Layer 1 and repeats packets, regardless of their MAC or IP addresses.

30.

What are the two main bands for Wi-Fi communications?

2.4 and 5 GHz

2.4 and 5 MHz

2.4 GHz and 5 MHz

2.4 MHz and 5 GHz

13.56 MHz and 3.5 GHz

Correct answer: 2.4 and 5 GHZ

The two main bands are 2.4 and 5 GHz. The 2.4-GHz band is used with older Wi-Fi standards, while the 5-GHz band is used with newer standards.

The 2.4-GHz and 900-MHz bands are used with Zigbee. The 868.42- and 908.42-MHz bands are used with Z-Wave. The 2.3- and 3.5-GHz bands are used with WiMax. The 13.56-MHz band is used with NFC.

31.

Which term describes the unique identifier of an AP?

BSSID

SSID

BSS

BSA

Correct answer: BSSID

The basic service set identifier (BSSID) is a unique identifier for an access point (AP). It is based on the AP's radio MAC address.

A secure set identifier (SSID) is a human-readable, non-unique identifier for a wireless network. A basic service set (BSS) is the topology of a single wireless channel centered upon an AP and includes its client hosts. A basic service area (BSA) is the physical area where an AP's signal is usable.

32.

Which two of the following are valid IPv6 addresses? (Choose two.)

4638:573e:e1df:047c:2d7f:c976:fb87:f2e3

62c0::1:0:0:15

20bc::0:25ce::f96e

2bd9:1dd4:1df5:c03d:28c3:0306:76b0

IPv6 addresses are 32 hexadecimal digits that are divided into 8 groups of 4 characters each. Each quartet is separated by colons. An IPv6 address can be abbreviated by removing leading zeroes in each quartet or using a single zero if a quartet is composed of 4 zeroes. Double colons can be used only one time in an abbreviation if there are consecutive quartets of zeroes.

33.

Which three columns will appear when running the command "show mac address-table dynamic?" (Choose three.)

Mac Address

Type

Ports

Aging Time

The output from running "show mac address-table dynamic" will include the columns: VLAN, Mac Address, Type, and Ports. To see the aging time, run the command "show mac address-table aging-time."

34.

A fashion retail company subscribes to a cloud service to handle their CRM. What type of public cloud model are they using?

SaaS

PaaS

IaaS

FaaS

Correct answer: SaaS

Software as a Service (SaaS) provides a pre-made application hosted on the cloud for customers to utilize. The customer does not need to worry about any of the cloud infrastructure in this model, they just receive the functionality of the cloud software.

Platform as a Service (PaaS) allows a customer to develop their own software in the cloud. Infrastructure as a Service (IaaS) allows customers to lease all the cloud infrastructure they need to accomplish their goals, such as CPU, memory, and storage. Function as a Service (FaaS) allows a customer to host a single function for doing one specific purpose in the cloud.

35.

Which of the following Power over Ethernet standards has 4 wired pairs?

UPoE

Cisco Inline Power

PoE

PoE+

Correct answer: UPoE

Power over Ethernet (PoE) has a negotiation process for providing power to devices so that they do not get too much current, which could harm the device. The UPoE standard uses 60 watts and 4 wired pairs.

Cisco Inline Power uses 7 watts over 2 wire pairs. PoE uses 15 watts over 2 wire pairs. PoE+ uses 30 watts over 2 wire pairs.

36.

Which of the following is not an interface type supported by a Cisco WLC?

Static interface

Management interface

Virtual interface

Service port interface

Correct answer: Static interface

A wireless LAN controller (WLC) has management, redundancy management, virtual, service port, and dynamic interfaces. It does not have a static type interface.

A management interface is used for normal management traffic. A virtual interface is an IP address facing wireless clients during DHCP requests. A service port interface is used for out-of-band management.

37.

Which two statements are true about an access switch? (Choose two.)

> **They connect directly to end users**

> **They use a star topology**

> They connect to the corporate WAN

> They connect switches between buildings

An access switch connects users to the network and utilizes a star topology in the access layer.

Distribution and core switches forward traffic between LAN switches. Core switches connect switches between buildings.

38.

An administrator cannot connect to one of their Linux systems via the network. After connecting to the system's terminal, what command can they run to see the system's IP parameters?

ifconfig

ipconfig

ping

netstat

Correct answer: ifconfig

The ifconfig command is a system utility on Linux that will display and also configure a network interface. Running it without options shows the configurations of all available interfaces.

The ipconfig command is used with Windows. The ping command is used to test connectivity between two nodes. The netstat command is used to view incoming and outgoing network connections.

39.

Which two terms describe what a router uses to make routing decisions? (Choose two.)

IP address

Logical address

MAC address

Physical address

Routers make decisions based off IP addresses (also called logical addresses). This is at Layer 3, the Network Layer, of the OSI and TCP/IP models.

A media access control (MAC) address is also called a physical address. It is at Layer 2 of the OSI and TCP/IP Models, and is used by unmanaged switches and bridges to make decisions.

40.

Which two statements are true about WPA2-Personal mode? (Choose two.)

It uses a key string that should be entered on each client and the AP

It uses a four-way handshake

It requires a separate authentication server

It implements the Advanced Encryption Standard (AES) to protect against eavesdropping of key exchanges

WPA2-Personal mode is used in smaller networks, while enterprise mode is used for larger organizations. WPA2-Personal utilizes a key string that has to be configured on the AP and entered into each client. WPA2-Personal uses a four-way handshake before sending encrypted data.

Enterprise mode requires authentication servers and is more complex to set up. WPA3-Personal has improvements over WPA2-Personal, including Simultaneous Authentication of Equals (SAE), which prevents eavesdropping during key exchanges. The Advanced Encryption Standard (AES) is an encryption algorithm used by both WPA2 and WPA3.

41.

What does a switch use to populate its MAC address table?

A frame's source MAC address

A frame's destination MAC address

A packet's source IP address

A packet's destination IP address

Correct answer: A frame's source MAC address

A switch examines incoming frames and their source MAC address. If the address is not in their address table, it will enter it there, along with the port from which it arrived.

The destination MAC address would not contain the address needed for the table. IP addresses will not be included in a MAC address table.

42.

Which of the following is true of single-mode fiber?

It has a maximum cable length of 40 kilometers.

It has a high susceptibility to interference.

It has a high risk of copying from cable emissions.

It uses an LED to emit light at multiple angles.

Correct answer: It has a maximum cable length of 40 kilometers.

Single-mode fiber is capable of sending data over distances of up to 40 kilometers. It uses a smaller core than multi-mode fiber, and it is more expensive to implement.

Fiber cables are not susceptible to interference. The cables do not have any faint emissions that can be detected, unlike UTP cables. A single-mode fiber uses laser light at a single angle to send data.

43.

What are three types of traffic which are ideal for UDP? (Choose three.)

VoIP

Video conferencing

Online gaming

FTP

Email

UDP is used over TCP when data transfers need to be fast, and it is acceptable for not every packet to make it through. That makes it ideal for applications like VoIP, video conferencing, and online gaming. TCP is used when all packets must be accounted for, such as with email or transferring files with FTP.

44.

Which process happens when a switch receives a broadcast frame?

Frame flooding

Frame switching

Frame filtering

MAC aging

Frame looping

Correct answer: Frame flooding

When a switch receives a broadcast frame, it forwards it to every interface, except for the originating one. This process is called frame flooding.

Frame switching occurs when a frame is destined for an address already in the switch's MAC address table. Frame filtering is when the switch drops the frame. MAC aging is when a MAC address expires from the MAC address table. Frame looping is when a frame has more than one path to a destination and gets stuck in a neverending loop.

45.

Which three options are typical features of a wireless router in a SOHO environment? (Choose three.)

Ethernet switch

AP

Firewall

WLC

A wireless router combines many network functions into one device. These include acting as an Ethernet switch, a wireless access point (AP), a firewall, and a router to the internet. A wireless LAN controller (WLC) is used to manage multiple APs and is used in an enterprise environment.

46.

What is the prefix for the following IPv6 address:
aff1:b22a:db61:1e72:6bac:c457:cd60:fafb / 64

aff1:b22a:db61:1e72:: / 64

aff1:b22a:db61:: / 64

::6bac:c457:cd60:fafb / 64

::6bac:c457 / 64

To identify the prefix (subnet ID) in an IPv6 address with a prefix length that is divisible by 4, take the prefix length and divide it by 4 to find the number of hex digits that are in the prefix. Then, change all hex digits after that and change them to 0. If the prefix length is 64, then the first 16 digits are in the prefix.

47.

Which two types of connections require a cross-over cable rather than a straight-through cable? (Choose two.)

Router to PC

Switch to switch

PC to switch

Switch to server

A cross-over cable is needed when connecting similar devices or connecting a PC to a router. A straight-through cable is used when connecting dissimilar devices, such as a device to a switch or hub.

48.

Which three of the following are considered endpoints? (Choose three.)

> **Smartphone**

> **VM**

> **Server**

> Hub

> Load balancer

An endpoint can have various definitions, but in general, it is a node that connects to the network rather than just filters data that passes through it. Examples of endpoints are desktops, laptops, smartphones, tablets, servers, workstations, and virtual machines (VMs). Devices that filter, repeat, or route data like switches, routers, hubs, firewalls, and load balancers, would not be considered endpoints.

49.

An administrator wants to set up a server that will run a hypervisor with four VMs for network services. They want to be sure that the system will be powerful enough to handle all the VMs.

What are three resources they should provision for when determining the specifications of the host server? (Choose three.)

> **RAM**

> **CPU**

> **Storage**

> GPU

> USB

When setting up a system for virtualization, it's important to have enough storage, including CPU, RAM, and NIC bandwidth, to support the VMs.

A graphics processing unit is not necessary for general networking services, and the VMs would not use the USB drives.

50.

Which type of address has a unique interface ID that is automatically generated by a router based on the device's MAC address?

Modified EUI-64

Subnet prefix

Solicited node

Embedded IPv4

Correct answer: Modified EUI-64

A modified EUI-64 address is derived from taking a device's MAC address. A modified EUI-64 address can be recognized because it has FFEE in the middle of the interface ID.

A subnet prefix is typically the first part of an IPv6 address based on the prefix length. A solicited node address is a multicast address used by the Neighbor Discovery Protocol. An embedded IPv4 address is an IPv6 address that has an IPv4 address within it.

51.

Which type of IPv6 address has the same concept as a private IPv4 address?

Unique local

Global multicast

Global unicast

Anycast

Correct answer: Unique local

A unique local in IPv6 works similarly to a private IPv4 address. They are not meant to be routable from the Internet.

A global unicast address is similar to an IPv4 public address. An anycast address is an address assigned to a set of interfaces on different nodes. While global multicast addresses are allowed by the standard, they are rarely used and are not the same as a private IPv4 address.

52.

What is the function of PoE?

To provide power to a device over the network

To offer network-based phone services

To offer access to processing power over the network

To protect cables from electrical interference

Correct answer: To provide power to a device over the network

Power over Ethernet (PoE) can be used to reduce the cost of running power lines to all devices. To use PoE, a compatible LAN switch acts as the Power Sourcing Equipment (PSE), and a device, such as a desk phone or access point, acts as the Powered Device (PD).

Networking over a power line is accomplished with different technology. Processing for endpoints can be done through remote desktops. Protecting cables from interference can be accomplished through cable sheathing.

53.

Which of the following addresses is a Class C private address?

192.168.0.20

192.0.0.4

172.16.0.5

10.0.0.20

172.30.31.8

Correct answer: 192.168.0.20

For a Class C network, the private IP networks are 192.168.0.0 to 192.168.255.0.

The class A private network is 10.0.0.0. Class B private networks are 172.16.0.0 through 172.31.0.0.

54.

Which term describes a software or hardware device that accepts and processes network requests?

Server

Firewall

Workstation

Router

Correct answer: Server

A server can be defined as a software or hardware device that accepts and processes network requests. There are servers for all sorts of different functions, including web, mail, application, file, and policy servers.

A firewall filters network traffic. A workstation sends requests to servers. A router forwards network traffic.

55.

Which four statements are among the criteria for defining a cloud service? (Choose four.)

Measured service

Rapid elasticity

Resource pooling

Broad network access

Multifactor credentials

According to the National Institute of Standards and Technology, there are five criteria that define a cloud service. Measured service is one criterion that states that the cloud usage can be measured exactly and billed accordingly. Rapid elasticity is a criterion that states that resources can quickly expand to meet demand. Resource pooling refers to resources coming from a pool of servers and being able to be assigned dynamically and without the client needing to know the underlying hardware. Broad network access refers to the service being available from multiple clients and different types of networks. Multifactor credentials refers to a type of authentication factor.

56.

Which three of the following terms are commonly used to refer to a switch's MAC address table? (Choose three.)

Switching table

Bridging table

CAM table

Routing table

Physical address table

A MAC address table can be referred to using many names, including switching table, bridging table, and Content-Addressable Memory (CAM) table.

A routing table makes decisions based on IP addresses. A hosts table maps IP addresses to host names.

57.

Which counter from the show interfaces command displays only the number of frames less than 64 bytes?

Runts

Giants

Throttles

Collisions

Input errors

Correct answer: Runts

Runts are frames that do not meet the minimum frame requirement of 64 bytes. They are often caused by collisions.

A giant is a frame above the maximum size of 1518 bytes. Throttles are the times when a receiver on the port was disabled. Collisions are the number of times packets were sent simultaneously. Input errors includes all input errors including grunts, grains, no buffer, etc.

58.

Which term describes a mechanism that allows the physical resources of a system to be shared amongst guest operating systems?

Hypervisor

Virtual machine

SDN

Container

Correct answer: Hypervisor

A hypervisor is software, firmware, or hardware that allows multiple virtual machines to be run on a single system. A Type 1 hypervisor runs directly on the system's hardware, while a Type 2 runs on top of a system's operating system.

A virtual machine is a guest operating system that runs on a hypervisor. Software-defined Networking (SDN) refers to managing networks through software rather than hardware. A container is an application and its dependencies that are bundled so they can be easily scaled and deployed.

59.

An administrator for a corporate network wants to use three channels in the 2.4 GHz band for their APs. They do not want any overlap in the frequencies. Which three channels can be used in this situation? (Choose three.)

1

6

11

3

5

There is overlap between nearby channels in the 2.4 GHz band for wireless networks. The only way to avoid overlap with three channels is to use channels 1, 6, and 11.

60.

Which of the following is an aspect of a Layer 3 switch?

It is used to implement VLANs

It works only with MAC addresses

It sends frames to destination addresses

It operates on the Data Link Layer

It has a single broadcast domain

Correct answer: It is used to implement VLANs

A Layer 3 switch has more functionality than a Layer 2 switch. It can implement VLANs so that a network can be partitioned logically, rather than just physically.

A Layer 2 switch works only with MAC addresses, rather than IP addresses. A Layer 2 switch sends frames, while a Layer 3 switch sends packets. A Layer 2 switch operates at the Data Link Layer, while the Layer 3 switch is at the Network Layer. A Layer 2 switch has a single broadcast domain, while a Layer 3 switch has multiple broadcast domains.

61.

Which of the following has the highest frequency?

> **Visible light**

> FM radio

> AM radio

> 5 GHz wireless

> 2 GHz wireless

Correct answer: Visible light

Visible light has a frequency of around 10^{14} Hz. This is only below ultraviolet light, x-rays, gamma rays, and cosmic rays.

FM radio has a frequency of around 100 Mhz. AM radio has a frequency of around 1000 Khz, and 2.4 GHz and 5 GHz wireless are both below the visible spectrum.

62.

How many switching layers are there in a spine-leaf architecture?

2

1

3

4

Correct answer: 2

A spine-leaf architecture has two layers: the spine and the leaf. The leaf layer has access switches that connect to servers and to each spine switch in a full-mesh topology.

63.

Which of the following commands specifically identifies an address as an anycast address on a router (rather than just another unicast address)?

show ipv6 interface

show ipv6 interface brief

show history

show ip interface brief

Correct answer: show ipv6 interface

The command to see an anycast address is: show ipv6 interface.

The brief option only shows a summary. The show history command shows a list of previously entered commands on the router.

64.

In which situation is a Layer 2 switch more advantageous than a Layer 3 switch?

When an administrator needs the network to be as fast as possible

When an administrator needs to create VLANs

When an administrator needs the switch to communicate outside the network

When an administrator needs a switch with routing functionality

Correct answer: When an administrator needs the network to be as fast as possible

A Layer 2 switch does not have to go up to Layer 3 to determine routing, which makes it faster than a Layer 3 switch.

Layer 3 switches are used to create VLANs, communicate outside the network, and give routing functionality.

65.

What are three disadvantages to using the Internet as the WAN connectivity to a public cloud? (Choose three.)

> **Security**

> **Capacity**

> **QoS**

> Migration

Using the Internet as the WAN connectivity to a public cloud can be convenient, but also has drawbacks. One drawback is security, because a private WAN connection means there is less chance of a man-in-the-middle type of attack. Capacity is another issue because moving an internal app to a public cloud can put extra load on an organization's Internet links. Quality of Service (QoS) is another issue because the Internet does not guarantee low latency or packet delivery like a private WAN can. Migration is an advantage of using the Internet as the WAN connectivity to a public cloud, because it is easy to switch to a different cloud provider because all providers use the Internet.

66.

An administrator wants a unified solution for their corporation's wireless network. They have numerous stand-alone, lightweight APs.

What can they implement to easily manage all the APs?

WLC

VLAN

WAN

Autonomous AP

Correct answer: WLC

A wireless LAN controller (WLC) is used to control many lightweight access points (APs). There are several different implementations of Cisco's WLC that can be tailored to networks of different sizes.

A virtual LAN (VLAN) logically segments a physical network into several distinct networks.

An autonomous AP is the other type of AP that doesn't need a WLC.

67.

An organization has a corporate WAN connecting one remote site to the main corporate LAN via a leased line. Which of the following best describes this WAN topology?

Point-to-point

Hub and spoke

Full mesh

Dual-homed

Correct answer: Point-to-point

A point-to-point link connects two nodes over a public, leased line. An example of this is a dial-up connection.

A hub and spoke topology has a single hub that other remote networks connect to. A full-mesh topology has each node at the edge of a location connected to every other edge node for redundancy. A dual-homed connection is a WAN link with two network interfaces for redundancy.

68.

An administrator wants to enter the IP address and subnet mask for an interface on a switch. Which command should they utilize while in VLAN interface mode?

ip address

ip default-gateway

ip name-server

show dhcp lease

interface vlan

Correct answer: ip address

The ip address command followed by the ip address and subnet mask is used for this configuration. It is a static configuration.

The ip default-gateway command lets a user change the switch's default gateway. The ip name-server lets a user change DNS servers. The show dhcp lease command lists information obtained from DHCP settings. The interface vlan command changes the context to VLAN interface mode.

69.

Which type of server has an architecture that uses several modular circuit boards that are each their own standalone server?

Blade server

Proxy server

Application server

Policy server

File server

Correct answer: Blade server

A blade server is a server with a modular design that maximizes physical space and energy use. It is also referred to as a high-density server.

A proxy server is a server that handles requests on behalf of another device. An application server is a server that handles business logic operations. A policy server is a server that helps enforce organization-wide policies and authentication. A file server is a server that centrally manages an organization's files.

70.

What is the default subnet mask for a Class C address?

255.255.255.0

255.255.0.0

255.0.0.0

255.255.255.255

0.0.0.0

Correct answer: 255.255.255.0

The subnet mask is used to define the host part and network part of an address. A Class C address has a default subnet mask of 255.255.255.0.

A Class A address has a mask of 255.0.0.0 and a Class B address has a default mask of 255.255.0.0. The other answer choices are not default subnet masks.

71.

Which two statements are true regarding using Ethernet as a WAN technology? (Choose two.)

They support cable lengths of 70 km

They let a service provider use EoMPLS for customers to connect their remote routers

They enable a customer to physically connect to remote sites using Ethernet cables

They let a service provider offer serial links for customers to connect their remote routers

Using Ethernet as a WAN technology has many advantages over using leased lines. Ethernet can support up to 70-km length cables with the 1000BASE-ZX standard. Service providers use Ethernet over Multiprotocol Label Switching (EoMPLS) so that customers can use Ethernet to send frames over the link.

HDLC and serial links are used with leased lines. Ethernet WAN emulates a physical Ethernet link, but telcos can use other technologies inside their network.

72.

A small business owner needs to purchase a device that will let them connect their computer to the internet with a wired connection, as well as support wireless connections to their mobile devices. What is the common term for this type of device in the consumer market?

Wireless router

WLC

AP

Ethernet switch

Modem

Correct answer: Wireless router

A wireless router is the common term for a multi-function device in SOHO networks. A wireless router will have an Ethernet switch, wireless access point, firewall, and modem.

A wireless LAN controller (WLC) is used to control a group of access points. An access point (AP) is a device that creates a wireless LAN. An Ethernet switch is a device that connects wired devices to a network. A modem is a device that converts data from one format to another in order to send it on a compatible network.

73.

What does an NGFW have that traditional firewalls do not?

Application awareness

Stateful inspection

Port filtering

Security zones

Correct answer: Application awareness

A next-generation firewall (NGFW) has many advantages over traditional firewalls. These advantages include application-level inspection, advanced malware protection, URL filtering, and integration with intrusion protection systems.

Traditional firewalls can do stateful inspections, filter based on ports, and implement security zones.

74.

Which command on macOS will show the default gateway of the device?

networksetup -getinfo Ethernet

networksetup -getdnsservers Ethernet

ipconfig /all

ip address

Correct answer: networksetup -getinfo Ethernet

With macOS, the command networksetup -getinfo Ethernet will show the default gateway. It also shows DHCP information, such as IP address and subnet mask.

The command networksetup -getdnsservers Ethernet will show DNS server information. The command ipconfig /all is used with Windows. The command ip address is usewith Linux.

75.

An administrator has received a new Cisco Catalyst switch and wants to set it up so that it can dynamically use its MAC address table. What do they need to do to make sure that it is enabled?

Nothing, it will work by default

Assign all interfaces to VLAN1

Enable all interfaces

Use the erase startup-config command

Turn on STP

Correct answer: Nothing, it will work by default

Cisco Catalyst switches are ready by default to start frame switching and learning the MAC addresses for ports.

By default, all interfaces are enabled and assigned to VLAN1. The "erase startup-config" command will remove configurations. STP is already enabled by default.

76.

What does a three-tier LAN design have that a two-tier LAN design does not?

A core layer that aggregates distribution switches

A distribution layer that aggregates access switches

A collapsed core layer for reducing network costs

Access switches that connect directly to end users

A partial mesh between the access and distribution layers

Correct answer: A core layer that aggregates distribution switches

A three-tier LAN design adds a core layer that is not present in a two-tier LAN design. The core layer aggregates distribution switches.

Both two-tier and three-tier LAN designs have a distribution layer, access switches, and partial meshes. A two-tier LAN design can utilize a collapsed core layer, which combines the distribution and core layers.

77.

Which wireless encryption method should never be used because it has been deprecated and has known weaknesses?

TKIP

CCMP

WPA2

GCMP

WPA3

Correct answer: TKIP

The Temporal Key Integrity Protocol (TKIP) was developed as a replacement for the Wired Equivalent Privacy (WEP), which was defined in the original 802.11 standard and uses the RC4 cipher algorithm for encryption, and uses a shared-key security method. However, both TKIP and WEP are now deprecated because of known weaknesses.

The Counter/CBC-MAC Protocol (CCMP) is a security method that uses AES counter mode encryption. Wi-Fi Protected Access 2 (WPA2) is a security method that uses CCMP with MIC and AES. The Galois/Counter Mode Protocol (GCMP) improves on CCMP. WPA3 is a security method that improves upon WPA2 by utilizing GCMP rather than CCMP.

78.

What of the following is not a characteristic of Ethernet shared media?

Created by using switches

Shared bandwidth

Security issues resulting from broadcasts

All computers share broadcast channel

Correct answer: Created by using switches

An Ethernet shared media network is characteristic of a network connected by hubs. These networks share bandwidth and can have security issues because all traffic is broadcasted to every node. By contrast, a network connected by switches forms an Ethernet point-to-point network.

79.

An IPv6 multicast address has FF0E as its first quartet. What does that say about its functionality?

It is global and has no boundaries

It is interface-local and should remain within a device

It is site-local and should not cross WAN links

It is link-local and routers should not forward it

Correct answer: It is global and has no boundaries

The first quartet of an IPv6 is related to its scope. The scope tells a router whether or not it should forward packets.

An interface-local scope has FF01 as its first quartet. A site-local scope has FF05 as its first quartet. A link-local scope has FF02 as its first quartet.

80.

Which two statements are true about IPv6 addresses? (Choose two.)

It is 128 bits long.

It is 32 hexadecimal digits.

It is 32 bits long.

It is written in dotted decimal notation.

It has a 20-byte header length.

An IPv6 address is 128 bits and written in hexadecimal. It has a 40-byte header length. IPv4 is 32 bits long, uses dotted decimal notation, and has variable header lengths.

81.

Which HDLC field lets the receiving node know that a new frame is arriving?

Flag

Address

Control

Type

FCS

Correct answer: Flag

High-level Data Link Control (HDLC) is a protocol for sending data over a leased line. The flag field uses a pattern that the receiving node interprets as a new frame arriving.

The address field gives the destination device. The control field is an obsolete field no longer used. The type field shows the type of Layer 3 packet that is encapsulated in the frame. The FCS field is used for error detection.

82.

Which two statements are characteristics of a Layer 3 switch, as opposed to a Layer 2 switch? (Choose two.)

Routes packets

Routes using IP addresses

Routes frames

Single broadcast domain

Routes using MAC addresses

A Layer 3 switch routes using IP addresses, while a Layer 2 switch uses MAC addresses. At Layer 3, data is in packets, while at Layer 2, data is in frames. A Layer 3 switch is slightly slower than a Layer 2 switch because it takes more time to examine data packets. A Layer 3 switch can have multiple broadcast domains, while a Layer 2 switch has only one broadcast domain.

83.

What is the purpose of a subnet mask in IP addressing?

> **To define the network and host portion of an address**

> To specify the address of the default gateway for a subnet

> To reserve addresses for special uses (broadcast, default gateway, etc.)

> To distinguish between public and private address spaces

Correct answer: To define the network and host portion of an address

A subnet mask is a 32-bit long address that distinguishes between the network and host.

A subnet's default gateway is explicitly specified on a device. The 255 address is reserved as a broadcast address. Addresses in the 19.2.168.1.x range are used for private addresses.

84.

Which command displays the contents of a switch's CAM table?

show mac address-table dynamic

show mac address-table aging-time

show mac address-table count

show interface status

Correct answer: show mac address-table dynamic

A Content-Addressable Memory (CAM) table, or MAC address table, can be viewed with the command: show mac address-table dynamic. It has columns for VLAN, MAC address, type, and ports.

The "show mac address-table aging-time" command shows global and per-VLAN timeouts for MAC table entries. The "show mac address-table count" command shows the number of entries in the MAC address table and how many are left. The "show interface status" command lists basic status and operating information for each interface line by line.

85.

Which term describes the number of times an electromagnetic wave oscillates per second?

Frequency

Cycle

Band

Hertz

Correct answer: Frequency

A frequency is the number of times an electromagnetic wave goes completely up and down per second.

A cycle is a complete traversal of a wave from its up state to down state and back. A band is a range of frequencies defined for a specific purpose. A hertz is a unit of measurement for frequencies, with one hertz being a single cycle per second.

86.

What are two ways in which private IPv4 networks have improved IPv4 networking? (Choose two.)

> **Delaying exhaustion of IPv4 addresses**

> **Reducing routing table size for Internet routers**

> Eliminating the need for network planning

> Replacing the use of subnetting

By using private IPv4 networks, the exhaustion of IPv4 addresses has been delayed because entire networks can use a single public IP address. In addition, Internet routers do not need to include routes to private networks in their routing tables. With private IPv4 networks, there is still a need for planning and subnetting.

87.

Which two wireless standards specify a maximum data rate of 54 Mbps? (Choose two.)

802.11g

802.11a

802.11n

802.11ac

The IEEE 802.11g and 802.11a standards specify a maximum data rate of 54 Mbps. The 802.11g supports the 2.4-GHz band and 802.11a supports the 5-GHz band.

The 802.11n standard has a max data rate of 600 Mbps. The 802.11ac standard has a max data rate of 6.93 Gbps.

88.

Which type of LAN design is characterized by a combined distribution and core layer and a partial mesh of links between access and distribution switches?

Two-tier

Three-tier

Spine-leaf

Star

Correct answer: Two-tier

A two-tier network topology has end-users and servers connect to access layer switches. The access layer and distribution layer are typically connected by a partial mesh for some redundancy rather than a full mesh.

A three-tier design separates the distribution and core layers. A spine-leaf topology uses a full mesh of links. A star topology is characterized by a single switch.

89.

How wide is each channel in Wi-Fi's 2.4 GHz band?

20 MHz

10 MHz

40 MHz

100 MHz

Correct answer: 20 MHz
The 2.4 GHz band is divided up into channels of 20 MHz each. There are up to 14 channels, with channels 1, 6, and 11 used the most frequently because they do not overlap.

90.

Which type of IPv6 address is used for data packets that should be sent to multiple hosts at the same time?

Multicast

Global unicast

Link local

Unique local

Anycast

Correct answer: Multicast

An IPv6 multicast works the same as an IPv4 multicast. A packet that is meant for multiple hosts can be sent to a multicast address.

A global unicast address is a routable, public address for a host. A link local address is used only with hosts in the same subnetwork. A unique local address is similar to a private IP address in IPv4. An anycast address is an address assigned to many interfaces which hosts can connect to, whichever is closest.

91.

A switch receives a frame from one of its ports that has a destination address which is listed in its MAC address table. What will the switch do with this frame?

Forward the frame to a single port

Drop the frame

Send the frame out to all ports except the originating one

Send the frame out to all ports

Correct answer: Forward the frame to a single port

If a switch already knows the port that has the destination address based on its MAC address table, it will send it only to that port. A switch can dynamically learn which MAC addresses are at which port when that system sends out a frame with its source address.

A switch will drop a frame for a few reasons, such as if its source and destination are the same. It will not send frames back to the port they originated from. It will only send the frame to all ports, except the originating one if the address is not in the MAC address table. It won't send a frame to all ports because that would include the source port.

92.

Which two statements are true about IPv6 global unicast addresses? (Choose two.)

They work like public IPv4 addresses.

They are assigned as a global routing prefix.

They work like private IPv4 addresses.

They do not require registration.

Global unicast addresses are reachable from anywhere on the IPv6 Internet and are the equivalent of public IPv4 addresses. They need to be registered with an authority before a block of IPv6 global unicast addresses can be used.

93.

Which line status/protocol status combination is typically caused by the shutdown command on a LAN switch's interface?

administratively down/down

down/down

up/down

down/down (err-disabled)

up/up

Correct answer: administratively down/down

An administratively down line status and down protocol status is indicative of the shutdown command being configured on the interface. This gives an interface status of disabled.

The down/down state could be a missing/bad cable, wrong cable pinots, speed mismatch, or device issue. The up/down state is not an expected state. The down/down (err-disabled) state is caused by port security being disabled. The up/up state shows the interface is functioning.

94.

A large company is in the process of setting up its corporate LAN. Which of the following network topologies is it least likely to use?

A wireless LAN access point with a built-in router that offers wired and wireless connections to the corporate LAN

A two-tier switch topology with a partial mesh between the access and distribution layers

A three-tier switch topology with a full mesh between the distribution and core layers

A multi-floor network with switches on each floor that connect to each other through a distribution switch

Correct answer: A wireless LAN access point with a built-in router that offers wired and wireless connections to the corporate LAN

A small office/home office (SOHO) network is a small network for a few people. It is characterized by having a device that combines the functionality of a router, switch, and wireless access point.

Networks with two-tier, three-tier, and distribution switches are for enterprise LANs.

95.

Which device acts as a switch for wireless networks?

AP

Router

Bridge

NGIPS

Endpoint

Correct answer: AP

A wireless LAN access point (AP) acts as a switch because multiple nodes communicate with it. An access point is often combined with a router and switch to provide an all-in-one solution for home offices.

A router is used to forward packets between different networks. A bridge is used to create a single network from various network segments. A next-generation intrusion protection system (NGIPS) is used to prevent attacks on a network. An endpoint is a device users operate, such as a workstation, server, or smartphone.

96.

Which command in Windows could be used to show a device's default gateway?

ipconfig /all

ifconfig /all

netstat /all

nslookup /all

Correct answer: ipconfig /all

On Windows, the ipconfig command gives TCP/IP network configuration information. The /all parameter includes additional information about DNS and DHCP servers.

The ifconfig command is used in Linux to manage a network interface. The netstat command provides information about active connections. The nslookup command gives information about domain names.

97.

An administrator wants to implement the same service on multiple routers so that users can get quicker access to it. Which type of IPv6 address would they use so that users in various locations would connect to the closest service?

Anycast

Unique local

Link local

Multicast

Correct answer: Anycast

An anycast address can be allotted to multiple hosts. A router will route packets to the nearest one.

A unique local address is not routable on the Internet. A link local address is used for automated functions between devices. A multicast address is a single address that a group of hosts can subscribe to.

98.

What are two characteristics of Ethernet shared media? (Choose two.)

> **They use half duplex**

> **They require CSMA/CD**

> They use full duplex

> Multiple nodes can send frames at the same time

The term "Ethernet shared media" refers to a LAN design that uses hubs. These segments are half duplex and require CSMA/CD so that only one device can successfully send information at a time.

By contrast, an Ethernet point-to-point network is characterized by LAN using switches that are full-duplex and allow devices to send and receive at the same time.

99.

Which three types of topology are you most likely to see in a three-tier LAN design? (Choose three.)

Star

Full mesh

Partial mesh

Ring

Bus

A three-tier network LAN design will have a hybrid of topologies. An access switch will have a star topology with its access links. A partial mesh can exist between access and distribution switches. Core switches may utilize a full mesh for maximum redundancy. A ring topology has each node connected to adjacent nodes. A bus topology has each node attached to the same cable.

100.

Which three statements are true about a spine-leaf network design? (Choose three.)

Each spine switch must connect with every leaf switch

Each leaf switch must connect with every spine switch

Endpoints only connect to leaf switches

Each spine switch must connect with every other spine switch

Endpoints only connect to spine switches

In a spine-leaf network, each spine switch connects with every leaf switch and vice-versa. Endpoints only connect to the leaf switches, not the spine switches.