**Multiple Choice Questions**

1. What is an IPv4 address made up of? a) A network portion and a server portion. b) A host portion and a gateway portion. c) A network portion and a host portion. d) A subnet mask and a network ID. **Correct Answer: c) A network portion and a host portion.**
2. How many bits are in an IPv4 address? a) 16 bits b) 32 bits c) 64 bits d) 128 bits **Correct Answer: b) 32 bits**
3. What is used to determine the network and host portions of an IPv4 address? a) Default Gateway b) DNS Server c) Subnet Mask d) IP Address **Correct Answer: c) Subnet Mask**
4. What is the actual process used to identify the network and host portions of an IPv4 address? a) ORing b) XORing c) ANDing d) NORing **Correct Answer: c) ANDing**
5. What is the prefix length? a) The number of bits set to 0 in the subnet mask. b) The number of bits set to 1 in the subnet mask. c) The total number of bits in an IPv4 address. d) The number of host bits. **Correct Answer: b) The number of bits set to 1 in the subnet mask.**
6. How is the prefix length typically written? a) In dot-decimal notation. b) In binary notation. c) In "slash notation". d) As a decimal number without a slash. **Correct Answer: c) In "slash notation".**
7. Which of the following is a type of IP address found within each network? a) Router address b) Switch address c) Network address d) Firewall address **Correct Answer: c) Network address**
8. Which type of transmission sends a packet to a single destination IP address? a) Broadcast b) Multicast c) Unicast d) Anycast **Correct Answer: c) Unicast**
9. Which type of transmission sends a packet to all other destination IP addresses? a) Unicast b) Multicast c) Broadcast d) Anycast **Correct Answer: c) Broadcast**
10. Which type of transmission sends a packet to a multicast address group? a) Unicast b) Multicast c) Broadcast d) Anycast **Correct Answer: b) Multicast**
11. According to RFC 1918, what are public IPv4 addresses? a) Used only for internal networks. b) Globally routed between internet service provider (ISP) routers. c) Used for loopback testing. d) Self-assigned addresses. **Correct Answer: b) Globally routed between internet service provider (ISP) routers.**
12. What is a characteristic of private IPv4 addresses? a) They are globally routable. b) They are unique across the internet. c) They are not globally routable. d) They are assigned by ISPs for public use. **Correct Answer: c) They are not globally routable.**
13. What does Network Address Translation (NAT) do? a) Translates public IPv4 addresses to private IPv4 addresses. b) Translates private IPv4 addresses to public IPv4 addresses. c) Translates IPv6 addresses to IPv4 addresses. d) Assigns IP addresses automatically. **Correct Answer: b) Translates private IPv4 addresses to public IPv4 addresses.**
14. Where is NAT typically enabled? a) On internal hosts. b) On switches within the LAN. c) On the edge router connecting to the internet. d) On DHCP servers. **Correct Answer: c) On the edge router connecting to the internet.**
15. Which organization manages and allocates blocks of IPv4 and IPv6 addresses to five Regional Internet Registries (RIRs)? a) IEEE b) IETF c) IANA d) ICANN **Correct Answer: c) IANA**
16. What are RIRs responsible for? a) Developing network protocols. b) Allocating IP addresses to ISPs. c) Manufacturing networking equipment. d) Providing internet service directly to end-users. **Correct Answer: b) Allocating IP addresses to ISPs.**
17. What is the commonly identified loopback address? a) 192.168.1.1 b) 10.0.0.1 c) 127.0.0.1 d) 169.254.0.1 **Correct Answer: c) 127.0.0.1**
18. What are loopback addresses used for? a) To communicate with external networks. b) To test if TCP/IP is operational on a host. c) To assign to network printers. d) To identify network routers. **Correct Answer: b) To test if TCP/IP is operational on a host.**
19. What is 169.254.0.0/16 commonly known as? a) Public IP addresses b) Reserved IP addresses c) Automatic Private IP Addressing (APIPA) addresses d) Multicast addresses **Correct Answer: c) Automatic Private IP Addressing (APIPA) addresses**
20. When are APIPA addresses used? a) When a host manually configures its IP address. b) When no DHCP servers are available for Windows DHCP clients. c) When a router fails to assign an IP address. d) When a host needs a public IP address. **Correct Answer: b) When no DHCP servers are available for Windows DHCP clients.**
21. Which classful addressing range includes 192.0.0.0/24? a) Class A b) Class B c) Class C d) Class D **Correct Answer: c) Class C**
22. What was a problem with classful addressing? a) It was too complex to implement. b) It wasted many IPv4 addresses. c) It did not support unicast transmissions. d) It was difficult to manage private addresses. **Correct Answer: b) It wasted many IPv4 addresses.**
23. What replaced classful address allocation? a) IPv6 addressing. b) Classless addressing. c) Static addressing. d) APIPA. **Correct Answer: b) Classless addressing.**
24. What happens to broadcasts when they are propagated by switches? a) They are propagated out all interfaces, including the one on which they were received. b) They are stopped at the switch. c) They are propagated out all interfaces except the interface on which they were received. d) They are converted to unicast packets. **Correct Answer: c) They are propagated out all interfaces except the interface on which they were received.**
25. Which device is the only one that stops broadcasts? a) Switch b) Hub c) Router d) Repeater **Correct Answer: c) Router**
26. Where are broadcasts only propagated? a) Across the entire internet. b) Within the specific broadcast domain. c) To all connected devices regardless of segment. d) Only to the destination host. **Correct Answer: b) Within the specific broadcast domain.**
27. What is a problem with a large broadcast domain? a) It improves network performance. b) It reduces network traffic. c) It can generate excessive broadcasts and negatively affect the network. d) It simplifies network management. **Correct Answer: c) It can generate excessive broadcasts and negatively affect the network.**
28. What is the solution to reduce the size of the network to create smaller broadcast domains? a) Increasing the number of routers. b) Implementing more switches. c) Subnetting. d) Using a single large network segment. **Correct Answer: c) Subnetting.**
29. Which of the following is a reason for segmenting networks? a) To increase overall network traffic. b) To expand the size of broadcast domains. c) To reduce the number of devices affected by abnormal broadcast traffic. d) To complicate network security. **Correct Answer: c) To reduce the number of devices affected by abnormal broadcast traffic.**
30. Besides reducing abnormal broadcast traffic, what else does subnetting reduce? a) Network latency. b) Overall network traffic. c) Application response time. d) The need for IP addresses. **Correct Answer: b) Overall network traffic.**
31. Subnetting can be used to implement what between subnets? a) More broadcast domains. b) Security policies. c) Larger network segments. d) Unmanaged devices. **Correct Answer: b) Security policies.**
32. At which octet boundaries are networks most easily subnetted? a) /1, /2, and /3 b) /8, /16, and /24 c) /30, /31, and /32 d) /4, /8, and /12 **Correct Answer: b) /8, /16, and /24**
33. What happens to the number of hosts per subnet when using longer prefix lengths? a) It increases. b) It decreases. c) It remains the same. d) It becomes unlimited. **Correct Answer: b) It decreases.**
34. What are the two considerations when planning subnets? a) The type of cabling and the brand of router. b) The number of host addresses required for each network and the number of individual subnets needed. c) The physical location of devices and the operating system used. d) The cost of equipment and the speed of the internet connection. **Correct Answer: b) The number of host addresses required for each network and the number of individual subnets needed.**
35. What does VLSM stand for? a) Very Large Subnet Mask b) Variable-Length Subnet Mask c) Virtual Local Subnet Management d) Verified Labeled Subnet Method **Correct Answer: b) Variable-Length Subnet Mask**
36. Why was VLSM developed? a) To increase the number of unused addresses. b) To simplify traditional subnetting. c) To avoid wasting addresses by enabling subnetting a subnet. d) To exclusively use classful addressing. **Correct Answer: c) To avoid wasting addresses by enabling subnetting a subnet.**
37. When using VLSM, what is the first step in satisfying host requirements? a) Begin by satisfying the host requirements of the smallest subnet. b) Randomly assign IP addresses. c) Begin by satisfying the host requirements of the largest subnet. d) Use a fixed subnet mask for all subnets. **Correct Answer: c) Begin by satisfying the host requirements of the largest subnet.**
38. What is an Intranet in an enterprise network? a) An external network accessible by anyone. b) A company's internal network typically using private IPv4 addresses. c) A network segment exclusively for public servers. d) A global network connection. **Correct Answer: b) A company's internal network typically using private IPv4 addresses.**
39. What is a DMZ (Demilitarized Zone)? a) A fully isolated network segment with no internet access. b) A company's internet-facing servers. c) A network exclusively for internal clients. d) A private network for development purposes. **Correct Answer: b) A company's internet-facing servers.**
40. What type of IP addresses do devices in the DMZ typically use? a) Private IPv4 addresses. b) Loopback addresses. c) APIPA addresses. d) Public IPv4 addresses. **Correct Answer: d) Public IPv4 addresses.**
41. Which of the following device types typically use DHCP to reduce errors and burden on network support staff for IP address assignment? a) Servers and peripherals. b) Intermediary devices. c) End user clients. d) Gateway routers. **Correct Answer: c) End user clients.**
42. What type of IP address should servers and peripherals have? a) Dynamically assigned. b) Predictable static IP addresses. c) Loopback addresses. d) Private only, never public. **Correct Answer: b) Predictable static IP addresses.**
43. How are servers accessible from the internet most often accessed? a) Directly with their private IP address. b) Using APIPA. c) Using NAT. d) Through a direct fiber optic connection only. **Correct Answer: c) Using NAT.**
44. What are intermediary devices (like routers and firewalls) assigned addresses for? a) Only for internet connectivity. b) Network management, monitoring, and security. c) Solely for broadcasting. d) To act as host devices. **Correct Answer: b) Network management, monitoring, and security.**
45. What is crucial to develop a scalable solution for an enterprise network? a) Random IP address assignment. b) IPv4 network address planning. c) Avoiding subnetting. d) Using only public IP addresses internally. **Correct Answer: b) IPv4 network address planning.**
46. When designing an IP addressing scheme, what is generally recommended regarding address allocation? a) To randomly allocate addresses. b) To use a consistent internal IP addressing scheme with a set pattern. c) To only use private addresses. d) To prioritize public addresses for all devices. **Correct Answer: b) To use a consistent internal IP addressing scheme with a set pattern.**
47. What is the objective of Module 11: IPv4 Addressing? a) To configure a router. b) To calculate an IPv4 subnetting scheme to efficiently segment your network. c) To troubleshoot network connectivity issues. d) To describe the layers of the OSI model. **Correct Answer: b) To calculate an IPv4 subnetting scheme to efficiently segment your network.**
48. What does "logical AND" operation produce only a 1? a) When both bits are 0. b) When one bit is 1 and the other is 0. c) When both bits are 1. d) When either bit is 1. **Correct Answer: c) When both bits are 1.**
49. What is the effect of subnetting on network performance? a) It decreases network performance. b) It has no impact on network performance. c) It improves network performance. d) It only affects security, not performance. **Correct Answer: c) It improves network performance.**
50. What must you examine when planning subnets to understand how they will be structured? a) The number of available network engineers. b) The organization's network usage needs. c) The type of internet service provider. d) The age of the networking equipment. **Correct Answer: b) The organization's network usage needs.**

**Fill in the Blanks:**

1. An IPv4 address is a **32**-bit hierarchical address that is made up of a network portion and a host portion.
2. A subnet mask is used to determine the **network** and **host** portions of an IPv4 address.
3. The actual process used to identify the network and host portions is called **ANDing**.
4. A prefix length is the number of bits set to **1** in the subnet mask.
5. **Unicast** transmission is sending a packet to one destination IP address.
6. **Broadcast** transmission is sending a packet to all other destination IP addresses.
7. **Multicast** transmission is sending a packet to a multicast address group.
8. **Public** IPv4 addresses are globally routed between internet service provider (ISP) routers.
9. **Private** addresses are common blocks of addresses used by most organizations to assign IPv4 addresses to internal hosts.
10. Private addresses are not globally **routable**.
11. Network Address Translation (NAT) translates private IPv4 addresses to **public** IPv4 addresses.
12. The Internet Assigned Numbers Authority (IANA) manages and allocates blocks of IPv4 and IPv6 addresses to five **Regional Internet Registries (RIRs)**.
13. **Loopback** addresses are commonly identified as only 127.0.0.1.
14. Link-Local addresses are commonly known as the **Automatic Private IP Addressing (APIPA)** addresses.
15. **Classful** addressing wasted many IPv4 addresses and was replaced with classless addressing.
16. The only device that stops broadcasts is a **router**.
17. Routers do not **propagate** broadcasts.
18. A problem with a large broadcast domain is that these hosts can generate **excessive** broadcasts and negatively affect the network.
19. The solution to reduce the size of the network to create smaller broadcast domains is called **subnetting**.
20. Subnetting reduces overall network **traffic** and improves network **performance**.
21. Subnets are used for a variety of reasons including by **Location**, **Group or Function**, and **Device Type**.
22. Networks are most easily subnetted at the octet boundary of **/8**, **/16**, and **/24**.
23. Using longer prefix lengths **decreases** the number of hosts per subnet.
24. There are two considerations when planning subnets: the number of host addresses required for each network and the number of **individual subnets** needed.
25. **VLSM** was developed to avoid wasting addresses by enabling us to subnet a subnet.
26. When using VLSM, always begin by satisfying the host requirements of the **largest** subnet.
27. An **Intranet** is a company's internal network typically using private IPv4 addresses.
28. A **DMZ** consists of a company's internet-facing servers.
29. Servers that are accessible from the internet must have a **public** IPv4 address, most often accessed using NAT.
30. End-user clients most often use **DHCP** to reduce errors and burden on network support staff