Name _____ Date _____

Module 12 – IPv6 Addressing

Introduction to Networks – Semester 1

Student Version

Module 12 Sections:

12.0 Introduction
12.1 IPv4 Issues
12.2 IPv6 Address Representation
12.3 IPv6 Address Types
12.4 GUA and LLA Static Configuration
12.5 Dynamic Addressing for IPv6 GUAs
12.6 Dynamic Addressing for IPv6 LLAs
12.7 IPv6 Multicast Addresses
12.8 Subnet an IPv6 Network
12.9 Module Practice and Quiz

Required Materials:

Reading Organizer

Packet Tracer Activities: 12.6.6 - Configure IPv6 Addressing
12.9.1 - Implement a Subnetted IPv6 Addressing Scheme

Labs: 12.7.4 - Identify IPv6 Addresses
12.9.2 - Configure IPv6 Addresses on Network Devices

Module's 11 – 13 Exam

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Points_____ / __112__

Name_____ Date _____

Module 12– IPv4 Addressing

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Note: The Reading Organizer has weighted scoring. Any question with the word **explain**, **define, or describe** in it is expected to have a longer answer and is worth two points each.

After completion of this chapter, you should be able to:

- Explain the need for IPv6 addressing.
- Explain how IPv6 addresses are represented.
- Compare types of IPv6 network addresses.
- Explain how to Configure static global unicast and link-local IPv6 network addresses.
- Explain how to configure global unicast addresses dynamically.
- Configure link-local addresses dynamically.
- Identify IPv6 addresses.
- Implement a subnetted IPv6 addressing scheme.

12.1 IPv4 Issues

1. IPv6 is designed to be the _____to IPv4.

2. IPv6 has a larger _____ address space, providing _____ undecillion possible addresses.

3. Explain what Internet Control Message Protocol version 6 (ICMPv6) includes.

4. IPv4 has a theoretical maximum of _____ billion addresses.

5. _____ addresses in combination with _____ have been instrumental in slowing the depletion of IPv4 address space.

6. Why is NAT is problematic for many applications?

a.

b.

7. The top two mobile providers in the United States report that over _____ of their traffic is over IPv6.

8. List and describe the three categories the IETF has created to help network administrators migrate the networks to IPv6.

a. _____ -

b. _____ -

c. _____ -

12.2 IPv6 Address Representation

9. IPv6 addresses are _____ bits in length and written as a string of hexadecimal values.

10. Every _____ bits is represented by a single hexadecimal digit; for a total of 32 hexadecimal values

11. The term _____ refers to the eight bits of an IPv4 address.

12. In IPv6, a _____is the unofficial term used to refer to a segment of 16 bits, or four hexadecimal values

13. Preferred format means that you write IPv6 address using all _____ hexadecimal digits.

14. What is Rule 1 when writing IPv6 addresses?

15. Using Rule 1 rewrite the IPv6 address shown below.

fe80 : 0000 : 0000 : 0000 : 0123 : 4567 : 89ab : cdef

Answer: _____

16. What is Rule 2 when writing IPv6 addresses?

The double colon.

17. Using Rule 2 rewrite the IPv6 address shown below.

fe80 : 0000 : 0000 : 0000 : 0123 : 4567 : 89ab : cdef

Answer: _____

18. What is the shortened version of the IPv6 address shown when you combine both Rule 1 and 2.

fe80 : 0000 : 0000 : 0000 : 0123 : 4567 : 89ab : cdef

Answer: _____

12.3 IPv6 Address Types

19. List and describe the three broad categories of IPv6 addresses.

a. _____ -

b. _____ -

c. _____ -

20. IPv6 does not have a _____ address.

21. The prefix, or network portion, of an IPv4 address can be identified by a _____ subnet mask or _____ length.

22. In IPv4 the /24 is called the _____. In IPv6 it is called the _____.

23. The prefix length can range from _____to _____.

24. The recommended IPv6 prefix length for LANs and most other types of networks is /_____.

25. Explain why it is strongly recommended to use a 64-bit Interface ID for most networks.

26. List the six different types of IPv6 unicast addresses.

a.

b.

c.

d.

e.

f.

27. List and describe the two IPv6 unicast addresses that networked devices have.

a. _____ -

b. _____ -

28. The IPv6 unique local addresses (LLA) have some similarity to RFC 1918 private addresses for IPv4. Explain these significant differences.

a.

b.

c.

29. List and describe the three parts of a Global Unicast Address (GUA).

a. _____ -

b. _____ -

c. _____ -

30. What does an IPv6 link-local address (LLA) enable a device to do?

31. Every IPv6-enabled network interface must have an _____.

32. What happens if an LLA is not configured manually on an interface?

33. IPv6 LLAs are in the _____ range.

34. Hosts use the LLA of a local router as the _____.

35. List and describe the two ways that a device can obtain an LLA.

a. _____ -

b. _____ -

12.4 GUA and LLA Static Configuration

36. List the two ways in which a device can obtain an IPv6 GUA automatically.

a.

b.

37. Configuring the LLA manually lets you create an address that is recognizable and easier to remember. Where is it typically necessary to create recognizable LLAs?

38. LLAs can be configured manually using the _____ command.

12.5 Dynamic Addressing for IPv6 GUAs

39. For the Global Unicast Address (GUA), a device obtains the address dynamically through _____ or _____ messages.

40. IPv6 routers periodically send out ICMPv6 RA messages, every _____, to all IPv6-enabled devices on the network.

41. _____ messages are sent to all IPv6 routers by hosts requesting addressing information.

42. _____ messages are sent to all IPv6 nodes.

43. If RA (SLAAC only) is used, what other information is sent with the RA?

a.

b.

c.

44. A router must be enabled for IPv6 routing, which is not enabled by default. What command is used to enable a router as an IPv6 router?

45. List and describe the three methods for RA messages.

a. Method 1:_____ -

b. Method 2: _____ -

c. Method 3: _____ -

46. When the RA message is either SLAAC or SLAAC with stateless DHCPv6, the client must generate its own _____.

47. Ethernet MAC addresses are usually represented in hexadecimal and are made up of two parts. List and describe these two parts.

a. _____ -

b. _____ -

12.6 Dynamic Addressing for IPv6 LLAs

48. All IPv6 devices must have an _____.

49. What command do Windows users type to verify their IPv6 address?

50. By default, Cisco IOS routers use _____ to generate the interface ID for all LLAs on IPv6 interfaces.

51. List three router commands that can assist you with IPv6 address verification.

a.

b.

c.

12.7 IPv6 Multicast Addresses

52. List the three broad categories of IPv6 addresses.

a.

b.

c.

53. What is a multicast address used for?

54. Multicast addresses can only be _____ addresses and not _____ addresses.

55. What are the two types of IPv6 multicast addresses.

a.

b.

56. Describe what an assigned multicast address is.

57. List the two common IPv6 assigned multicast groups.

a.

b.

12.8 Subnet an IPv6 Network

58. Label the three parts of a Global Unicast Address (GUA)