Name _____ Date _____

Module 8 – Network Layer
Introduction to Networks – Semester 1
Student Version

Module 8 Sections:

Required Materials:

Reading Organizer

Packet Tracer Activities: None

Labs: None

Module's 8 – 10 Exam

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| Points_____ / ___116___ |

Name_____ Date _____

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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 how the network layer uses IP protocols for reliable communications.
- Explain the role of the major header fields in the IPv4 packet.
- Explain the role of the major header fields in the IPv6 packet.
- Explain how network devices use routing tables to direct packets to a destination network.
- Explain the function of fields in the routing table of a router.

8.1 Network Layer Characteristics

1. The _____layer, or OSI Layer <u>3</u>, provides services to allow end devices to exchange data across networks.

2. To accomplish end-to-end communications across network boundaries, network layer protocols perform four basic operations. List and describe the four basic operations.
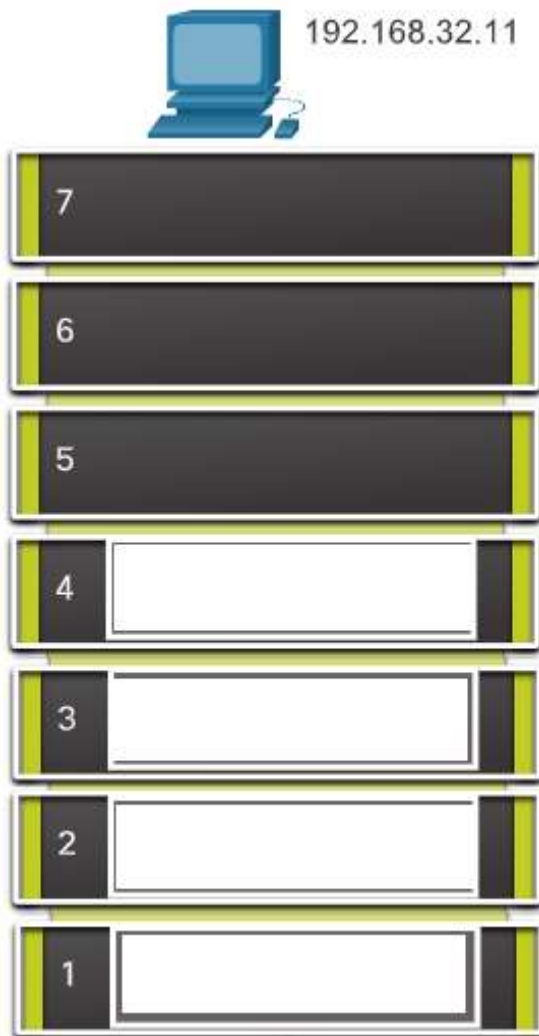
       a. _____ –

       b. _____ –

       c. _____ –

d. _____ –

3. Write in the encapsulation steps that occur in the OSI model layers 1 through 4.

192.168.32.11

| 7 |
| 6 |
| 5 |
4	
3	
2	
1	

4. The process of encapsulating data layer by layer enables the services at the different layers to _____ and _____ without affecting the other layers.

5. IP was designed as a protocol with low overhead. What does IP provide?

6. The IP protocol was not designed to track and manage the flow of packets. What handles these functions?

7. List and describe the basic characteristics of IP.

    a. _____ –

    b. _____ –

    c. _____ –

8. IP is connectionless, explain.

9. As an unreliable network layer protocol, IP does not guarantee that all sent packets will be <u>received.</u>

10. Unreliable means that IP does not have the capability to manage and recover from _____ or _____ packets.

11. If out-of-order packets are delivered, or packets are missing, how is this resolved?

12. In the TCP/IP protocol suite, how is reliability handled?

13. The OSI _____ layer is responsible for taking an IP packet and preparing it for transmission over the communications medium.

14. What is the major characteristic of the media a network is using that the network layer considers?

15. In some cases, an intermediate device, usually a router, must split up an IPv4 packet when forwarding it from one medium to another medium with a smaller MTU. What is this process is called?

8.2 IPv4 Packet

16. The _____ is used to ensure that this packet is delivered to its next stop on the way to its destination end device.

17. List the significant fields in the IPv4 header.

    a.

    b.

    c.

    d.

    e.

    f.

    g.

18. What are the two most commonly referenced fields in the IPv4 packet header?

8.3 IPv6 Packet

19. List and describe the three major issues IPv4 has.

    a. _____ –

    b. _____ –

    c. _____ –

20. Lis and describe the improvements that IPv6 provides.

    a. _____ –

    b. _____ –

    c. _____ –

21. How many unique addresses does a 32-bit IPv4 address space provides?

22. How many unique addresses does IPv6 address space provides?

23. What is one of ther major design improvements of IPv6 over IPv4?

24. List the fields in an IPv6 packet header.

     a.

     b.

     c.

     d.

     e.

     f.

     g.

25. Unlike IPv4, routers do not _____ routed IPv6 packets.

8.4 How a Host Routes

26. Who can a host send packets to?

     a.

     b.

     c.

27. The source end device determines whether the destination IP address is on the same network that the source device itself is on. The method of determination varies by IP version. Describe both.

     a. <u>In IPv4</u> –

     b. <u>In IPv6</u> –

28. The router connected to the local network segment is referred to as the _____

29. What features are usually found on a default gateway?

    a.

    b.

    c.

30. A _____ is required to send traffic outside of the local network.

31. In IPv4, the host receives the IPv4 address of the default gateway in one of two ways. These are:

    a.

    b.

32. What two commands can be used on a Windows host to display the host routing table?

    a.

    b.

33. The netstat -r command or the equivalent route print command displays three sections related to the current TCP/IP network connections. List and describe each.

    a. _____ –

    b. _____ –

    c. _____ –

8.5 Introduction to Routing

34. Explain in detail what happens when a packet arrives on a router interface?

35. The routing table stores three types of route entries. List and describe each.

    a. _____ –

    b. _____ –

    c. _____ –

36. A router can learn about remote networks in one of two ways. List and describe both.

    a. _____ –

    b. _____ –

37. What happens if there is a change in the network topology of a network using static routes?

38. Describe the characteristics of static routing.

    a.

    b.

    c.

    d.

39. A dynamic routing protocol allows the routers to automatically learn about _____ networks, including a _____, from other routers.

40. Dynamic routing protocols include _____ and _____ _____.

41. Basic configuration only requires the network administrator to enable the directly connected networks within the dynamic routing protocol. List what the dynamic routing protocol will do automatically.

    a.

    b.

    c.

    d.

42. What do the following common route source codes from the show ip route command indicate?

    a. _____ - Directly connected local interface IP address
    b. _____– Directly connected network
    c. _____– Static route was manually configured by an administrator
    d. _____- OSPF
    e. _____- EIGRP

43. A directly connected route is automatically created when a router interface is configured with _____and is _____.