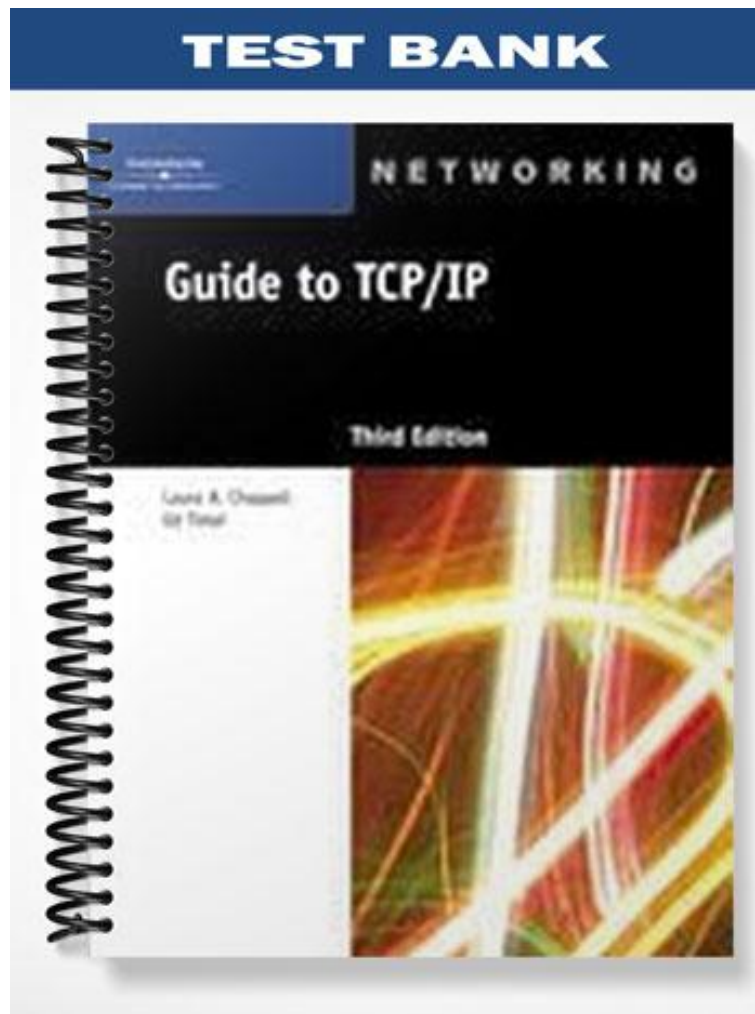


**TEST BANK**



## ch02

### True/False

Indicate whether the statement is true or false.

- \_\_\_ 1. IP addresses have links to domain names to make it possible for users to identify and access resources on a network.
- \_\_\_ 2. As a frame moves from interface to interface, the IP source and destination address information is preserved.
- \_\_\_ 3. Class D addresses always take the following binary form: 11111111.bbbbbbbb.bbbbbbbb.bbbbbbbb
- \_\_\_ 4. When a host uses a service that employs a multicast address, it registers itself to “listen” on that address, as well as on its own unique host address (and the broadcast address).
- \_\_\_ 5. One of the design goals that drives the next generation of IP (known as IPv6; the current generation is known as IPv4) is to increase the address space from 32 bits to 256 bits.

### Multiple Choice

Identify the choice that best completes the statement or answers the question.

- \_\_\_ 6. To be valid, any domain name must correspond to at least one unique \_\_\_\_.
  - a. loopback address
  - b. numeric IP address
  - c. firewall
  - d. IP gateway
- \_\_\_ 7. The \_\_\_\_ addressing scheme consists of a six-byte numeric address, burned into firmware (on a chip) by network interface manufacturers.
  - a. symbolic
  - b. logical numeric
  - c. reverse proxy
  - d. physical numeric
- \_\_\_ 8. \_\_\_\_ is used to permit computers to translate numeric IP addresses to MAC layer addresses.
  - a. ARP
  - b. RARP
  - c. Reverse proxying
  - d. Subnet masking
- \_\_\_ 9. \_\_\_\_ is used to translate MAC layer addresses into numeric IP addresses.
  - a. ARP
  - b. RARP
  - c. Reverse proxying
  - d. Subnet masking
- \_\_\_ 10. A \_\_\_\_ represents a network address that all hosts on a network must read.
  - a. loopback
  - b. hop
  - c. broadcast address
  - d. dot squad
- \_\_\_ 11. \_\_\_\_ permits existing addresses to be combined into larger routing domains with more host addresses than simple addition of the normal number of host addresses for each domain would supply.
  - a. Supernetting
  - b. Classless Inter-Domain Routing
  - c. Subnet masking
  - d. Address masquerading
- \_\_\_ 12. RFC \_\_\_\_ reserves three ranges of IP addresses for private use - a single Class A (10.0.0.0–10.255.255.255), 16 Class Bs (172.16.0.0–172.31.255.255), and 256 Class Cs (192.168.0.0–192.168.255.255).
  - a. 1517
  - b. 1518
  - c. 1878
  - d. 1918
- \_\_\_ 13. \_\_\_\_ lets networks use multiple private IP addresses internally and maps them to one or more public IP addresses externally.
  - a. DNS
  - c. NAT

- b. IP gateway  
d. VoIP
- \_\_\_ 14. The binary equivalent of decimal 62 is \_\_\_\_.  
a. 1111101  
b. 1011111  
c. 111110  
d. 101110
- \_\_\_ 15. The decimal equivalent of binary 10000000 is \_\_\_\_.  
a. 128  
b. 192  
c. 224  
d. 248
- \_\_\_ 16. A \_\_\_\_ is a special bit pattern that “blocks off” the network portion of an IP address with an all-ones pattern.  
a. reverse proxy  
b. summary address  
c. broadcast address  
d. subnet mask
- \_\_\_ 17. A(n) \_\_\_\_ is a device that interconnects multiple IP networks or subnets.  
a. subnet mask  
b. IP gateway  
c. layer-3 switch  
d. network address
- \_\_\_ 18. \_\_\_\_ gets its name from the notion that it ignores the traditional A, B, and C class designations for IP addresses and can therefore set the network-host ID boundary wherever it wants to, in a way that simplifies routing across the resulting IP address spaces.  
a. Route aggregation  
b. Address masquerading  
c. NAT  
d. Classless Inter-Domain Routing
- \_\_\_ 19. \_\_\_\_ may be performed by boundary devices that include proxy server capabilities to replace private IP addresses with one or more public IP addresses as outbound traffic exits the server, and to replace such public addresses with their proper private equivalents as incoming traffic passes through the server.  
a. IP renumbering  
b. Supernetting  
c. Address masquerading  
d. Subnetting
- \_\_\_ 20. One of the most important services that a \_\_\_\_ provides is to manage what source addresses appear in outbound packets that pass through it.  
a. loopback  
b. proxy server  
c. subnet mask  
d. layer-3 switch
- \_\_\_ 21. The simplest form of subnet masking uses a technique called \_\_\_\_, in which each subnet includes the same number of stations and represents a simple division of the address space made available by subnetting into multiple equal segments.  
a. constant-length subnet masking  
b. firewall  
c. dot squad  
d. anycast
- \_\_\_ 22. One form of subnet masking uses a technique called \_\_\_\_ and permits a single address to be subdivided into multiple subnets, in which subnets need not all be the same size.  
a. IP gateway  
b. constant-length subnet masking  
c. variable-length subnet masking  
d. IP renumbering
- \_\_\_ 23. \_\_\_\_ addresses are used for multicast communications, in which a single address may be associated with more than one network host machine.  
a. Class A  
b. Class B  
c. Class C  
d. Class D
- \_\_\_ 24. When a computer on one subnet wishes to communicate with a computer on another subnet, traffic must be forwarded from the sender to a nearby \_\_\_\_ to send the message on its way from one subnet to another.  
a. broadcast address  
b. IP gateway  
c. subnet mask  
d. proxy server
- \_\_\_ 25. The term \_\_\_\_ is used to describe the data frame crossing a router.  
a. firewall  
b. hop  
c. loopback  
d. dot squad

- \_\_\_\_\_ 26. Given the scarcity of public IP addresses at present, only \_\_\_\_\_, or other organizations with extremely compelling reasons to request such addresses, are likely to be granted a public IP address by ICANN.
- a. ISPs
  - b. telephone companies
  - c. CIDRs
  - d. ASICs

### Completion

*Complete each statement.*

27. The physical numeric address functions at a sub-layer of the Data Link layer in the OSI network reference model, called the \_\_\_\_\_.
28. \_\_\_\_\_ informs the network interface card to pass packets sent to that address to the IP stack so their contents can be read, and tells the IP gateway to forward such traffic onto the physical network, where the listening network interface resides.
29. The decimal equivalent of binary 11111111 is \_\_\_\_\_.
30. The activity of stealing (borrowing) bits from the host portion to further subdivide the network portion of an address is called \_\_\_\_\_.
31. \_\_\_\_\_ “steal” bits from the network portion of an IP address to “lend” those bits to the host.

### Matching

*Match each item with a statement below.*

- a. 0 and 255
- b. Class D addresses
- c. Class E addresses
- d. 255.0.0.0
- e. 255.255.255.0
- f. Secure end-to-end connection
- g. ICANN
- h. Application Specific Integrated Circuits
- i. IP addresses

- \_\_\_\_\_ 32. Used by switches to make decisions.
- \_\_\_\_\_ 33. Used for multicast addresses.
- \_\_\_\_\_ 34. Default mask for Class A networks.
- \_\_\_\_\_ 35. Allows IP traffic to move in encrypted form between the sender and receiver without intermediate translation.
- \_\_\_\_\_ 36. Manages all IP-related addresses, protocol numbers, and well-known port addresses, and also assigns MAC layer addresses for use in network interfaces.
- \_\_\_\_\_ 37. Default mask for Class C networks.
- \_\_\_\_\_ 38. The lowest and highest values that can be represented in an eight-bit string.
- \_\_\_\_\_ 39. Have links to domain names thus making it possible for users to identify and access resources on a network.
- \_\_\_\_\_ 40. Used for experimental purposes only.

### Short Answer

41. What are the steps involved in designing a CLSM subnet mask in which each portion of the network has the same number of addresses?
42. What are the limitations of creating a CIDR address?

43. Most organizations need public IP addresses only for two classes of equipment. Briefly describe each of these classes.
44. Why are concepts such as subnets and supernets important for TCP/IP networks?
45. How does VSLM ensure that smaller subnet address spaces can access the resources they need as efficiently as possible?
46. List the constraints that determine the number and size of networks.
47. Briefly discuss IP's three-part addressing scheme.
48. What is the difference between subnetting and supernetting?
49. What are the disadvantages of using private IP addresses?
50. Give two reasons why you should use binary boundaries.

## ch02

### Answer Section

#### TRUE/FALSE

- |           |        |         |
|-----------|--------|---------|
| 1. ANS: T | PTS: 1 | REF: 57 |
| 2. ANS: T | PTS: 1 | REF: 57 |
| 3. ANS: F | PTS: 1 | REF: 62 |
| 4. ANS: T | PTS: 1 | REF: 64 |
| 5. ANS: F | PTS: 1 | REF: 67 |

#### MULTIPLE CHOICE

- |            |        |            |
|------------|--------|------------|
| 6. ANS: B  | PTS: 1 | REF: 56    |
| 7. ANS: D  | PTS: 1 | REF: 56    |
| 8. ANS: A  | PTS: 1 | REF: 57    |
| 9. ANS: B  | PTS: 1 | REF: 57    |
| 10. ANS: C | PTS: 1 | REF: 63    |
| 11. ANS: B | PTS: 1 | REF: 66    |
| 12. ANS: D | PTS: 1 | REF: 67    |
| 13. ANS: C | PTS: 1 | REF: 67    |
| 14. ANS: C | PTS: 1 | REF: 68    |
| 15. ANS: A | PTS: 1 | REF: 70    |
| 16. ANS: D | PTS: 1 | REF: 71    |
| 17. ANS: B | PTS: 1 | REF: 72    |
| 18. ANS: D | PTS: 1 | REF: 77    |
| 19. ANS: C | PTS: 1 | REF: 79    |
| 20. ANS: B | PTS: 1 | REF: 81    |
| 21. ANS: A | PTS: 1 | REF: 72    |
| 22. ANS: C | PTS: 1 | REF: 72-73 |
| 23. ANS: D | PTS: 1 | REF: 59    |
| 24. ANS: B | PTS: 1 | REF: 72    |
| 25. ANS: B | PTS: 1 | REF: 57    |
| 26. ANS: A | PTS: 1 | REF: 82    |

#### COMPLETION

27. ANS:  
Media Access Control layer  
media access control layer  
MAC layer
- PTS: 1                      REF: 57
28. ANS: Registration

PTS: 1                    REF: 64  
29. ANS: 255

PTS: 1                    REF: 70  
30. ANS:  
    subnetting  
    subnetting a network address

PTS: 1                    REF: 72  
31. ANS: Supernets

PTS: 1                    REF: 76

## MATCHING

32. ANS: H	PTS: 1	REF: 83
33. ANS: B	PTS: 1	REF: 62
34. ANS: D	PTS: 1	REF: 71
35. ANS: F	PTS: 1	REF: 79
36. ANS: G	PTS: 1	REF: 82
37. ANS: E	PTS: 1	REF: 71
38. ANS: A	PTS: 1	REF: 56
39. ANS: I	PTS: 1	REF: 57
40. ANS: C	PTS: 1	REF: 62

## SHORT ANSWER

41. ANS:

1. Decide how many subnets are needed.
2. Because the number of subnets needed must be represented by a bit pattern, add 2 to the number of subnets needed (one for the network address, the other for the broadcast address), then jump to the nearest higher power of two. If the result of the sum is an even power of two, you can use it directly.
3. Reserve bits of the host portion's address from the top down.
4. Be sure that there are enough host addresses left over on each subnet to be usable.
5. If you're using RIP, use the formula  $2^b - 2$  to calculate the number of usable subnets from a mask, in which b is the number of bits in the subnet mask, and 2 is subtracted to account for the network (all-zeroes) and broadcast (all-ones) addresses that every IP network and subnetwork require. If you're using some other routing protocol in which all 0s and all 1s aren't taken, use the formula  $2^b$  instead.

PTS: 1                    REF: 73

42. ANS:

1. All the addresses in the CIDR address must be contiguous. Use of the standard network prefix notation for addresses, however, also makes it tidy and efficient to carve up any kind of address, as needed.

2. When address aggregation occurs, CIDR address blocks work best when they come in sets that are greater than 1 and equal to some lower-order bit pattern that corresponds to all 1s - namely in groups of 3, 7, 15, 31, and so on. That's because this makes it possible to borrow the corresponding number of bits (two, three, four, five, and so on) from the network portion of the CIDR address block and use them to extend the host portion instead.

3. CIDR addresses are commonly applied to Class C addresses (which are small, and relatively plentiful). But for organizations that wish to subdivide existing Class A or Class B addresses, CIDR also works very well.

4. To use a CIDR address on any network, all routers in the routing domain must "understand" CIDR notation. This is typically not a problem for most routers that were built after September 1993, when RFCs 1517, 1518, and 1519 were approved, because most router vendors began to support CIDR addresses at that time.

PTS: 1 REF: 78

43. ANS:

Devices that permit organizations to attach networks to the Internet. These include the external interfaces on boundary devices of all kinds, such as routers, proxy servers, and firewalls, that help maintain the perimeter between the "outside" and "inside" on networks.

Servers that are designed to be accessible to the Internet. These include public Web servers, e-mail servers, FTP servers, news servers, and whatever other kind of TCP/IP Application layer services an organization may want to expose on the public Internet.

PTS: 1 REF: 80

44. ANS:

The reason concepts like subnets and supernets are important for TCP/IP networks is that each of these ideas refers to a single "local neighborhood" on such a network, seen from a routing perspective. When network addresses are further subdivided beyond their defaults for whatever class to which an address belongs, such subnetting represents "stealing bits" (borrowing bits) from the host portion of the address and using those stolen (borrowed) bits to create multiple routing regions within the context of a single network address.

PTS: 1 REF: 71

45. ANS:

One way to do this is to make sure that the servers such subnets access are most frequently attached directly to that subnet, or that they are in the same three-bit subnet address space as the original subnets, even if that three-bit subnet space was subdivided into fourteen five-bit containers.

PTS: 1 REF: 76

46. ANS:

These are:

Number of physical locations

Number of network devices at each location

Amount of broadcast traffic at each location

Availability of IP addresses

Delay caused by routing from one network to another

PTS: 1 REF: 82



47. ANS:

*Symbolic:* This consists of names that take a particular form, such as *www.support.dell.com*.

*Logical numeric:* This consists of a set of four numbers, separated by periods, as in 172.16.1.10. Each of these four numbers must be smaller than 256 in decimal to be represented in eight binary digits, or bits.

*Physical numeric:* This consists of a six-byte numeric address, burned into firmware (on a chip) by network interface manufacturers.

PTS: 1                      REF: 56

48. ANS:

Subnetting means stealing bits from the host portion of an address and using those bits to divide a single network address into multiple subdivisions called subnets. Supernetting on the other hand, takes the opposite approach: by combining contiguous network addresses, it steals bits from the network portion and uses them to create a single, larger contiguous address space for host addresses.

PTS: 1                      REF: 72

49. ANS:

The disadvantages are:

Such addresses may not be routed across the public Internet.

Some IP services require what's called a secure *end-to-end connection* - IP traffic must be able to move in encrypted form between the sender and receiver without intermediate translation. Thus, if either party to such a connection uses a public IP address, it's easiest to configure if both parties use a public IP address because the address for the "private end" of the connection cannot be routed directly across the Internet.

PTS: 1                      REF: 79-80

50. ANS:

One reason is that, in the future, you may want to implement layer-3 switching to reduce the broadcast traffic, and if the devices fit in a binary boundary, you won't have to readdress them.

Another good reason to use binary boundaries is that one day you will want to classify your traffic to apply **Quality of Service (QoS)** or policies of some sort.

PTS: 1                      REF: 84