CCNA TEST

Engineering Journal and Workbook, Vol. 1 - Chapter 1 - Basics of Computing

1. Which of the following best defines networking?
a. A set of rules or procedures that are either widely used or officially specified
*b. A connection of computers, printers, and other devices for the purpose of communication
c. A set of rules that govern how computer workstations exchange information
d. A device connected to a computer to provide auxiliary functions

2. What is a connection of computers, printers, and other devices for purpose of communication?
a. Peripheral
*b. Network
c. Mainframe
d. Protocol

3. Which of the following terms is used in computing to refer to physical parts or equipment?
*a. Hardware
b. Software
c. Protocol
d. Network

4. Which of the following terms is used in computing to refer to programs or applications?
a. Hardware
*b. Software
c. Peripheral
d. Network

5. Which of the following refers to devices connected to a computer to provide auxiliary functions such as printing, added disk space, scanning, or CD-ROM?
a. Protocol
b. Software
*c. Peripheral
d. Network

6. Why are individual PCs not efficient or cost effective for business applications?
a. Individual PC use requires businesses to duplicate equipment and resources.
b. It is difficult for businesses to communicate quickly or efficiently using individual PCs.
c. It is difficult to provide management for operating individual PCs.
*d. All of the above.

7. What is a standalone computer?
a. A computer that manages data efficiently
b. A computer that shares files and printers with other computers
*c. A computer that operates independently from other computers
d. A computer that has a different operating system

8. What kind of computer operates independently from other computers?
a. Mainframe
b. PC

c. Mac
*d. Standalone

9. Why did standalone computers become an inefficient and ineffective way for businesses to operate?
a. Businesses had to duplicate equipment and resources.
b. It was difficult to communicate quickly or efficiently using standalone computers.
c. It was difficult to provide management for operating standalone computers.
*d. All of the above.

10. What does the term protocol mean in computing terms?
a. A tool that lets Macintosh and PC computers communicate with each other
b. A universal translator that allows different kinds of computers to share data
*c. A description of a set of rules and conventions that govern how devices on a network exchange information
d. The language that all the computers on a network must use to communicate with each other

11. Which of the following best defines protocol?
*a. A formal description of a set of rules and conventions
b. A device connected to a computer to provide auxiliary functions
c. A group of people who are assigned to work as a team
d. The connection of computers, printers, routers and switches

12. What is a formal description of a set of rules and conventions called?
a. Peripheral
*b. Protocol
c. Standard
d. Network

13. Why are protocols important?
*a. By setting rules, they allow different types of computers to talk to each other.
b. By consolidating the industry, they save companies money.
c. By forming electronic islands, they bypass the sneaker net.
d. By using common carriers, they manage data efficiently.

14. What must all computers on a network be able to do for the network to operate properly?
a. Print to a local printer
b. Connect to a telephone line
c. Use CD-ROMs
*d. Speak the same language

15. A protocol allows which of the following to be linked into a network?
a. Only PC terminals and workstations
b. Only Macintosh computers and peripherals
c. Only PCs to a mainframe
*d. Any type of computer terminal or workstation

Engineering Journal and Workbook, Vol. 1 - Chapter 2 - The OSI Model
1. Which of the following best defines standards?
*a. A set of rules or procedures that are either widely used or officially specified

b. A connection of computers, printers, and other devices for purposes of communication
c. A set of rules that govern how computer workstations exchange information
d. A device connected to a computer to provide auxiliary functions

2. What is the OSI model?
a. A conceptual framework that specifies how information travels through networks
b. A model that describes how data makes its way from one application program to another through a network
c. A conceptual framework that specifies which network functions occur at each layer
*d. All of the above

3. As described by the OSI model, how does data move across a network?
a. Directly from each layer at one computer to the corresponding layers at another computer
b. Through wires connecting each layer from computer to computer
*c. Down through the layers at one computer and up through the layers at another
d. Through layers in wires between computers

4. Which best defines the function of the lower layers (called the media layers) of the OSI model?
a. Provide for the accurate delivery of data between computers
b. Convert data into the ones and zeros that a computer understands
c. Receive data from peripheral devices
*d. Control the physical delivery of messages over the network

5. Which of the following describes the host layers of the OSI model?
a. Control the physical delivery of messages over the network
b. Make up the lower layers in the OSI model
c. Contain data that is more like ones and zeros than like human language
*d. Provide for accurate delivery of data between computers

6. Which of the following best describes the purpose of the physical layer?
*a. Defines the electrical, mechanical, procedural, and functional specifications for activating, maintaining, and deactivating the link between end systems
b. Provides reliable transit of data across a physical link
c. Provides connectivity and path selection between two end systems
d. Establishes, manages, and terminates sessions between applications and manages data exchange between presentation layer entities

7. Which layer of the OSI model is concerned with physical addressing, network topology, line discipline, error notification, ordered delivery of frames, and flow control?
a. Physical layer
*b. Data link layer
c. Transport layer
d. Network layer

8. Which layer of the OSI model provides connectivity and path selection between two end systems where routing occurs?
a. Physical layer
b. Data link layer
*c. Network layer
d. Transport layer

9. Which layer of the OSI model is responsible for reliable network communication between end nodes and provides mechanisms for the establishment, maintenance, and termination of virtual circuits, transport fault detection and recovery, and information flow control?
a. Physical layer
b. Data link layer
c. Network layer
*d. Transport layer

10. Which layer of the OSI model establishes, manages, and terminates sessions between applications and manages data exchange between presentation layer entities?
a. Transport layer
*b. Session layer
c. Presentation layer
d. Application layer

11. Which layer of the OSI model ensures that information sent by the application layer of one system will be readable by the application layer of another system, is concerned with the data structures used by programs, and negotiates data transfer syntax for the application layer?
a. Transport layer
b. Session layer
*c. Presentation layer
d. Application layer

12. Which layer of the OSI model identifies and establishes the availability of intended communication partners, synchronizes cooperating applications, and establishes agreement on procedures for error recovery and control of data integrity?
a. Transport layer
b. Session layer
c. Presentation layer
*d. Application layer

13. Which of the following best defines encapsulation?
a. Segmenting data so it will flow uninterrupted through the network
b. Compressing data so it will move faster
c. Moving data in groups so it will stay together
*d. Wrapping of data in a particular protocol header

14. What analogy might be used to describe encapsulation?. Encapsulation is like a blueprint for building a car.
*b. Encapsulation is like sending a package through the mail.
c. Encapsulation is like building a fence around your backyard.
d. Encapsulation is like driving a car to the store to buy groceries.

15. What is a data packet?
*a. Logically grouped units of information.
b. Transmission devices.
c. Auxiliary function provided by peripherals.
d. Virtual circuits.

Engineering Journal and Workbook, Vol. 1 - Chapter 3 - LANs
1. What business problem resulting from the proliferation of standalone computers did networks solve?
*a. Inability to communicate and lack of management
b. Losses due to lack of business by common carriers
c. Inefficient use of information technology professionals

d. Increasing level of electromagnetic interference

2. What did early networks allow?
a. Common carriers to finally make a profit
b. Workers to copy files onto floppies and then carry the disks to a coworker's PC to print
c. The duplication of resources to expand
*d. The easy and efficient sharing of files and printers

3. Which of the following is not a problem that networking helped solve?
a. Lack of network management
*b. Lack of new hardware and software products
c. Duplication of equipment and resources
d. Inability to communicate efficiently

4. Why is it desirable to network?
a. Don't have to duplicate equipment and resources
b. Makes it easy to communicate quickly or efficiently using standalone computers
c. Makes it easy to provide management for operating standalone computers
*d. All of the above

5. Why is networking a variety of networks together difficult?
a. People try to network different types of computer systems together.
*b. Emerging network technologies use different hardware and software specifications.
c. Incompatibility due to hardware changes.
d. Computer designers try to make their own protocols and they are incompatible.

6. Why are networking standards needed?
a. Many networks now cover wide geographic areas.
*b. Technologies must be compatible to allow communication.
c. Hardware and software are continually being redesigned.
d. LANs, MANs, and WANs use different kinds of equipment.

7. Why did networks experience problems in the mid-1980s?
*a. Many new network technologies were incompatible.
b. Employees preferred sneaker net.
c. Common carriers went bankrupt.
d. Everyone used the same hardware and software.

8. Why did using different hardware and software cause problems once networks were established?
a. Networks cannot be formed if some people have Macs and others have PCs.
b. Different hardware and software did not provide auxiliary functions for the users.
*c. Different hardware and software implementations used in the new technologies were incompatible.
d. Each department or business was not able to act as an electronic island; instead, they were forced to work together.

9. What is a LAN?
*a. A network that connects workstations, terminals, and other devices in a geographically limited area.
b. A network that connects workstations, terminals, and other devices in a metropolitan area.
c. A network that serves users across a broad geographic area and often uses transmission devices provided by a common carrier.

d. A network that covers a larger area than a MAN.

10. Which of the following best describes a LAN?
*a. A data network connecting workstations, peripherals, terminals, and other devices in a single building or other geographically limited area.
b. A data network that connects workstations, peripherals, terminals, and other devices across a broad geographic area.
c. A data network that connects workstations, peripherals, terminals, and other devices across a metropolitan area.
d. A data network that connects workstations, peripherals, terminals and other devices within a single building.

11. What is a network that connects computer equipment in a single building called?
*a. LAN
b. WAN
c. MAN
d. DCN

12. A segment of a network is
a. A section consisting of several interconnected computers, such as a LAN
b. A physical wire, such as CAT 5 cable of fiber optic cable
*c. A single PC that is part of a LAN
d. A part of a network that has been temporarily disconnected

Engineering Journal and Workbook, Vol. 1 - Chapter 4 - Electronics and Signals
1. Which of the following correctly describes the type of signal carried by the network media?
a. Coaxial cable carries pulses of light.
b. Unshielded twisted-pair cable carries impedance signals.
*c. Shielded twisted-pair cable carries electrical impulses.
d. Fiber-optic cable carries electrical impulses.

2. Which network media carries pulses of light?
a. Coaxial cable
*b. Fiber-optic cable
c. Unshielded twisted-pair cable
d. Shielded twisted-pair cable

3. Which of the following is an external source of degradation of the signal on cabling?
*a. EMI caused by electrical motors
b. RFI caused by light leakage
c. Impedance caused by radio systems
d. RFI caused by lighting

4. Which of the following describes cabling signal degradation by an external source?
a. Poor cabling shield connection
*b. RFI caused by radio systems
c. EMI caused by twisting of wires
d. Impedance caused by electrical motors

5. What is the cause of crosstalk?
a. Cable wires that are too large in diameter
b. Too much noise in a cable's data signal
c. Electrical motors and lighting
*d. Electrical signals from other wires in a cable

6. How does crosstalk occur?
a. Two wires are placed in close proximity to each other.
b. NIC cards fail to discriminate the noise from the data signal.
*c. Electrical noise originates from signals on other wires in the cable.
d. Wires in a cable absorb electrical impulses from sources outside the cable.

7. What is a cost-effective method of limiting cable signal degradation?
*a. Specify the maximum cable length between nodes.
b. Increase the size of the conductors in the cabling.
c. Improve the type of insulating material.
d. Use a braid or foil covering on wires as a shield.

8. How can cable signal degradation be limited in a cost-effective way?
a. Improve the type of insulating material.
*b. Place same-circuit wires close to each other.
c. Use a braid or foil covering on wires as a shield.
d. Increase the diameter of the conductor in the cabling.

9. What is cancellation in networking media?
*a. The magnetic fields of same-circuit wires cancel each other.
b. External magnetic fields cancel the fields inside network cabling.
c. Wires in the same circuit cancel each other's electrical current flow.
d. Twisting wire pairs cancels the electrical impedance in the wires.

10. Which of the following describes cancellation in cabling?
a. Wires in the same circuit cancel each other's electrical current flow.
*b. Twisting wire pairs provides self-shielding within the network media.
c. The magnetic fields of wires on different electrical circuits cancel each other.
d. External magnetic fields cancel the fields inside network cabling.

11. Which of the following describes impedance in networking media?
a. Impedance involves resistance and reactance to current caused by signal degradation.
b. Electrical components in the NIC cards create impedance on the networking media.
c. Signal degradation causes impedance.
*d. Networking media impedance needs to match the NIC card electrical components.

12. When can impedance degrade the signal in networking media?
a. When resistance opposes reactance
*b. When cable impedance does not match NIC card electrical components
c. When networking media is not properly shielded from EMI/RFI interference
d. When cancellation techniques are not employed

13. Which of the following best describes attenuation?
a. Termination of a message
b. Interception of a message
*c. Weakening of a message
d. Ignoring of a message

14. How is data transmitted on a network?
a. As hexadecimal code

b. As ASCII text
c. As ones and zeros
*d. As voltage pulses

15. Which best describes the states of digital signals?
a. Alphanumeric
b. Octets
*c. On or off
d. Yes or no

16. What does the binary number 1 correspond to in a digital signal?
*a. On
b. One
c. The letter "A"
d. Off

17. What does the binary number 0 correspond to in a digital signal?
a. On
b. One
c. The letter "A"
*d. Off

18. Which best describes a digital signal?
a. A sine wave of normal shape and amplitude
b. An electrical technique used to convey binary signals
*c. Language of computers with only two states, on and off, which are indicated by a series of voltage pulses
d. Transmission sent by a transceiver back to a controller to let it know the collision circuitry is functional

19. How do computers recognize digital signals?
a. They receive a broadcast signal from the network.
b. They look for ARP requests that match their IP address.
c. They monitor the network connection for modulations.
*d. They measure and compare the signals to a reference point.

20. What is the signal reference ground?
a. Neutral contact point where the computer chassis and the network connection meet
*b. Point used by devices to measure and compare incoming digital signals to
c. Device that the name server uses to send messages over the network
d. Ground that prevents users from receiving shocks when power fails

21. What is the point used by a device to measure and compare incoming digital signals called?
a. Input point
b. Zero point
c. Null reference setting
*d. Signal reference ground

22. How is the signal reference ground established?
a. By connecting the ground wire to the network wire
b. By connecting the network wire to the jumper connector
*c. By connecting the ground plane to the computer's cabinet
d. By connecting the computer chassis to the network cable

23. What purpose does the computer chassis serve?
a. Prevents electrical short circuits and electrical fires
*b. Signal reference ground and AC power line ground
c. Amplifies digital signals

d. Reduces electromagnetic interference

24. What is the most likely cause of interference on a network?
a. Improper cabling and jack choices
b. Electromagnetic interference from radios and other electrical devices
c. High voltage device in the vicinity
*d. Problems with the power ground

25. What is the most likely cause of problems with the power ground?
*a. Length of the neutral and ground wires in electrical outlets
b. Excessive stripping or untwisting of cable
c. Equipment not located in climate controlled area
d. Poor quality cabling material used in network

26. What do long neutral and ground wires in electrical outlets act as?
a. Lightning rods
b. Amplifiers for digital signals
*c. Antenna for electrical noise
d. Line signal dampeners

27. How does electrical noise affect networks?
a. Shuts down the network
b. Burns out network devices, especially hubs
c. Reduces data transmission speed through the network because error-trapping routines are initiated
*d. Distorts or buries digital signals to the point that they become unrecognizable

28. How can the problem of electrical noise be avoided?
a. By limiting the number and type of electrical devices near the LAN
*b. By working closely with your electrical contractor and the local power company
c. By making sure all electrical devices are FCC and UL listed
d. By installing surge suppressors on every network device

29. How can the problem of electrical noise be avoided?
a. By installing surge suppressors on every network device
b. By making sure all electrical devices are FCC and UL listed
*c. By getting a single power transformer dedicated to your LAN
d. By limiting the number and type of electrical devices near the LAN

30. How can having a single power transformer dedicated to your LAN reduce electrical noise?
a. You can detect and filter out fluctuations in line voltage before it reaches your LAN.
b. You can specify the size and capacity of the transformer.
c. You can place the transformer in a central location.
*d. You can control how and where devices such as motors or high current devices are attached.

31. What does installing separate breaker boxes for each office area do to electrical noise?
*a. Reduces chance of electrical noise.
b. Reduces need for surge protectors.
c. Eliminates need for a generator.
d. Eliminates need for network rewiring.

1. What type of fiber-optic cable is required by the EIA/TIA-568B standard for horizontal cabling?
a. Two pair of 100 ohm cable
b. Two pair of 150 ohm cable
*c. Two fibers of 62.5/125 um multimode cable
d. Four fibers of 62.5/125 um multimode cable

2. How can you determine which category of UTP cable any cabling belongs to?
a. By looking at the end connectors
*b. By reading the UL marking
c. By measuring the cable diameter
d. By the color of the cable sheathing

3. Why do networks need to use an access method?
*a. To regulate access to the networking media equitably
b. To regulate the access of data into certain parts of networking media
c. To keep unwanted, foreign users from having access to the network
d. To prioritize data transmissions so that important items have greater access

4. Which of the following best describes an access method?
a. The method used by software to access network file servers
b. The method used to verify users as authorized for access to the network
c. The way users access the network
*d. The way network devices access the network medium

5. What access method is used by Ethernet?
a. Token header transmission protocol
b. Ethernet does not use an access method
*c. Carrier sense multiple access collision detect
d. Ethernet transmission carrier collision detect

6. Which best describes carrier sense multiple access collision detect (CSMA/CD)?
*a. Devices check the channel to make sure no signals are being sent before transmitting data.
b. Devices transmit data and listen to make sure they are received properly.
c. Devices transmit a request prior to transmitting data over the network and wait for an "all-clear" reply.
d. Devices monitor the channel continuously to track and manage traffic.

7. Which of the following is not a function of CSMA/CD?
a. Transmitting and receiving data packets
b. Decoding data packets and checking them for valid addresses
c. Detecting errors within data packets or on the network
*d. Cleaning up collisions on the network medium

8. Which of the following best describes a collision?
*a. The frames from two devices impact and are damaged when they meet on the physical media.
b. Two nodes transmit at the same time and one data packet has priority so it obliterates the lesser packet.
c. Two data transmissions cross paths on the network media and corrupt each other.
d. A data transmission is corrupted due to an energy spike over the network media.

9. Which of the following best describes a backoff algorithm?

a. A process wherein the network holds up some data so that other more important data can get through
*b. The retransmission delay enforced when a collision occurs
c. The signal that a device on the network sends out to tell the other devices that data is being sent
d. A mathematical function performed by networking software that prioritizes data packets

Engineering Journal and Workbook, Vol. 1 - Chapter 6 - Layer 2: Data Link Layer
1. Where do all communications on a network originate?
a. Peripherals
*b. Sources
c. Computers
d. Hosts

2. Which of the following best defines a source?
a. Logically grouped units of information
b. Network device that receives data
c. Computer that operates independently from other computers
*d. Network device that is sending data

3. What is a source address?
a. A source address receives data and information from other computers in a network.
*b. A source address sends data and information to other computers in a network.
c. A source address is information that moves between computers in a network.
d. A source address provides connectivity between computers in a network.

4. Where are all communications on a network being sent?
a. Source
b. Computer
c. Data link
*d. Destination

5. Which of the following best defines a destination?
a. Logically grouped units of information
*b. Network device that is receiving data
c. Redundant use of equipment to prevent data loss
d. Network device that is sending data

6. What is another name for link-layer addresses?
a. IP addresses
b. Network addresses
c. Logical addresses
*d. Physical addresses

7. What is another name for link-layer addressees?
*a. MAC addresses
b. IP addresses
c. Logical addresses
d. Network addresses

8. Where are link-layer addresses usually located?
a. In the routing table
*b. On the NIC
c. In the ARP cache

d. In the name server tables

9. On which layer of the OSI model are physical addresses located?
a. Presentation layer
b. Session layer
*c. Data link layer
d. Network layer

10. Which is true about MAC addresses?
*a. Unique for each LAN interface
b. Located at the network layer
c. Also called logical addresses
d. Used to identify host networks

11. Where is the MAC address located?
a. At the network layer
*b. Burned into ROM at the factory
c. In the AUI
d. At the MAU interface

12. Which of the following describes the structure of a MAC address?
a. 32-bit network identity plus 32-bit host identity
b. Network, subnet, subnet mask, host
*c. 24-bit vendor code plus 24-bit serial number
d. Network code plus serial number

13. Which of the following could be a MAC address?
a. 172.15.5.31
b. 1111.1111.111
c. FFFF.FFFF.FFFF
*d. 0000.0c12.3456

Engineering Journal and Workbook, Vol. 1 - Chapter 7 - Layer 2: Technologies
1. Which best describes the data link layer of the OSI model?
a. Transmits data to other network layers
b. Provides services to application processes
c. Takes weak signals, cleans them, amplifies them, and sends them on their way across the network
*d. Provides reliable transit of data across a physical link

2. Which layer provides reliable transit of data across a physical link?
*a. Data link
b. Physical
c. Application
d. Transport

3. What processes is the data link layer concerned with?
*a. Physical addressing, network topology, line discipline, error notification, ordered delivery of frames, and flow control
b. Establishing, managing, and terminating sessions between applications and managing data exchange between presentation layer entities
c. Synchronizing cooperating applications and establishing agreement on procedures for error recovery and control of data integrity
d. Providing mechanisms for the establishment, maintenance, and termination of virtual circuits, transport fault detection, recovery, and information flow control

4. Physical addressing and network topology are handled by which layer?
a. Physical

b. Presentation
*c. Data link
d. Session

5. On a network, where does a device connect to the media?
a. Ethernet card
b. Hub
c. Router
*d. NIC card

6. What is another name for the MAC address?,
a. Binary address
b. Octadecimal address
*c. Physical address
d. TCP/IP address

7. In which layer is the MAC address located?
a. Session
*b. Data link
c. Physical
d. Transport

8. What does MAC address stand for?
a. Macintosh Access Capable
b. Mainframe Advisory Council
*c. Media Access Control
d. Machine Application Communication

9. Which of the items listed below is located in the data link layer?
a. Destination
b. Peripheral
c. Repeater
*d. MAC address

10. What is required for every port or device that connects to a network?
a. Repeater
b. Termination
*c. MAC or physical address
d. ATM switch

11. Which of the following best describes MAC addressing?
*a. Addresses reside in the NIC card and are assigned by their manufacturers.
b. Addresses are assigned by the IEEE committee and need to be requested by the network administrator.
c. Addresses are determined by the distance of the computer from the network hub.
d. Addresses are given to every computer when they are manufactured.

12. How does a source device locate the destination for data on a network?
*a. The NIC at the destination identifies its MAC address in a data packet.
b. A data packet stops at the destination.
c. The NIC at the destination sends its MAC address to the source.
d. The source sends a unique data packet to each MAC address on the network.

13. Which of the following best describes internetworking devices?

a. Products that determine the optimal path along which network traffic should be forwarded
b. Products that contain multiple independent, connected modules of network equipment
c. Network connections or a junction common to two or more lines in a network
*d. Products used to connect separate networks to each other

Engineering Journal and Workbook, Vol. 1 - Chapter 8 - Design and Documentation
1. Which of the following does not describe a wiring closet?
a. Room used for housing the wiring for a voice network
b. Room used for housing the wiring for a data network
*c. Room at the center of a Token Ring topology
d. Room at the center point of a star topology

2. Which of the following equipment is not typically found in a wiring closet?
*a. Telecommunications outlets
b. Patch panels
c. Wiring hubs
d. Routers

3. What is a wiring closet?
a. Room where electrical power enters a commercial building
*b. Room used for housing the wiring for a data or voice network
c. Room at the center of a token ring network
d. Room where the entire power supply to a commercial building can be controlled

4. In a large network, what is a wiring closet that other wiring closets are dependent upon called?
a. Master wiring facility (MWF)
b. Master star topology (MST)
*c. Main distribution facility (MDF)
d. Extended star topology (EST)

5. What is the difference between a main distribution facility (MDF) and intermediate distribution facility (IDF)?
a. The MDF contains the primary network server and the major network devices while the IDFs contain only the necessary additional routers and repeaters.
b. The MDF is on the lowest floor in a multifloor network while the IDFs are on upper floors.
c. The MDF has all the bridges, hubs, routers, and ports needed for the network while the IDFs hold any needed repeaters.
*d. The MDF is the primary communications room and the central point in the network while the IDFs are secondary communications rooms dependent upon the MDF.

6. Which of the following is not a feature of a network with more than one wiring closet?
*a. Dependent star topologies
b. An MDF
c. An IDF
d. An extended star topology

7. What type of network topology usually has more than one wiring closet?
a. Token Ring

*b. Extended star
c. Tree
d. Bus

8. Which of the following best describes a type of connection made at the LAN patch panel?
a. Network device ports connect directly to patch panel pins.
b. Horizontal cabling runs connect directly to the horizontal cross-connect.
c. Horizontal cabling runs connect directly to telecommunications outlets.
*d. Patch cords connect the horizontal cross-connect directly to the patch panel.

9. Which of the following is not a type of connection made at the LAN patch panel?
a. Patch cords interconnect computers and hubs.
*b. Patch cords directly connect devices to telecommunications ports.
c. Horizontal cabling runs are terminated at the patch panel.
d. Patch cords connect the horizontal cross-connect directly to the patch panel.

Engineering Journal and Workbook, Vol. 1 - Chapter 9 - Structured Cabling
1. Which of the following statements best describes the EIA/TIA-569 specification for wiring closets?
*a. There should be a minimum of one wiring closet for every floor of a building.
b. There should be a maximum of one wiring closet for every floor of a building.
c. There should be a minimum of two wiring closets for every floor of a building.
d. There should be a maximum of two wiring closets for every floor of a building.

2. Which of the following best describes the EIA/TIA-569 standard for additional wiring closets?
a. Additional wiring closets should be provided for each area up to 90 square meters when the floor area served exceeds 90 square meters or the horizontal cabling distance exceeds 90 meters.
b. Additional wiring closets should be provided for each area up to 100 square meters when the floor area served exceeds 100 square meters or the horizontal cabling distance exceeds 9 meters.
c. Additional wiring closets should be provided for each area up to 1000 square meters when the floor area served exceeds 1000 square meters or the horizontal cabling distance exceeds 30 meters.
*d. Additional wiring closets should be provided for each area up to 1000 square meters when the floor area served exceeds 1000 square meters or the horizontal cabling distance exceeds 90 meters.

3. If Acme Inc. occupies 3500 square meters on the second floor of a building, how many wiring closets should be installed according to EIA/TIA 569?
a. One
b. Two
c. Three
*d. Four

4. If Acme Inc. occupies the first three floors of a building and each floor is 1500 square meters, how many wiring closets should be installed according to EIA/TIA 569?
a. One
b. Three
*c. Six
d. Nine

5. Which of the following is not a specification for walls, floors, and ceilings of a wiring closet?
a. A minimum of 15 feet of wall space. should be provided for terminations and related equipment for the POP.
*b. Rooms selected for wiring closets should have a dropped or false ceiling for easy access.
c. Interior walls on which equipment is to be mounted should be covered with 3/4" plywood that is raised away from the underlying wall a minimum of 1 3/4".
d. Floor coverings should be tile or other type of finished surface to help control dust.

6. What is a point of presence (POP)?
a. The point where the horizontal cabling connects to the backbone
b. The point where the electrical power lines enter the building
*c. The point where the telephone company's equipment and the building's main distribution facility connect
d. The point where the network and the electrical system of the building connect

7. Why should wiring closets not have a dropped or false ceiling?
a. The minimum ceiling height specified by EIA/TIA-569 cannot be met in most rooms with most dropped or false ceilings.
b. The temperature and humidity cannot be adequately controlled.
c. Dust from the ceiling materials poses a problem for long term equipment maintenance.
*d. Access is not controlled because people can get into the room through the ceiling.

8. What kind of floor should the wiring room have?
*a. Tile or other finished surface
b. Carpet
c. Unfinished stone
d. Electronics grade carpet

9. What is the minimum and maximum relative humidity level that should be maintained for rooms serving as wiring closets?
a. Between 10% and 50%
b. Between 20% and 70%
*c. Between 30% and 50%
d. Between 30% and 70%

10. What should the approximate temperature in a wiring closet be when all LAN equipment is fully functioning?
a. 60 degrees Fahrenheit
b. 65 degrees Fahrenheit
*c. 70 degrees Fahrenheit
d. 75 degrees Fahrenheit

11. Which of the following is not a requirement for lighting fixtures or power outlets in a wiring closet?
*a. Fluorescent lighting is recommended to avoid outside interference.

b. A wall switch to turn room lighting on and off should be located immediately inside the door.
c. At least one duplex power outlet should be located every ten feet along each wall in a main distribution facility.
d. At least two duplex power outlets should be located along each wall if the wiring closet is to serve as an intermediate distribution facility.

12. Why should fluorescent light fixtures be avoided in wiring closets?
a. They provide false color lighting, which can lead to mistakes in making connections.
*b. They generate outside electrical interference.
c. They can degrade some plastic materials used in network equipment.
d. There often is insufficient room in a wiring closet to change out the fluorescent bulbs easily and safely.

13. Which of the following is not a requirement for room and equipment access in a wiring closet?
a. The door should be at least three feet wide and should swing open out of the room to ensure easy access to the room for workers and equipment.
b. The wiring closet should lock from an outside access in such a way that exiting from the room is always possible.
c. Wiring hubs and patch panels may be wall-mounted using hinged wall brackets that are attached to the plywood covering the underlying wall surface.
*d. When a distribution rack is used to mount patch panels and wiring hubs, the minimum distance for the rack from the wall should be six inches.

14. Which of the following is not a wiring closet specification for cable access and support?
a. Access to the wiring closet for all horizontal cabling coming from the work areas should be via a raised floor.
b. All cable leaving the room to intermediate distribution facilities and computer and communications rooms located on other floors of a building should be via four-inch conduits or sleeved cores.
*c. One excess sleeved core or conduit should be provided in each wiring closet in order to provide for future anticipated growth.
d. Any wall or ceiling openings provided for conduits or sleeved cores must be sealed with smoke and flame retardant materials.

15. What is the first step in locating a wiring closet for a network?
a. Identify the number of computers that will be part of the network.
b. Identify the number of printers and file servers that will be part of the network.
*c. Identify all devices that will be connected to the network on a floor plan.
d. Identify the topological requirements of devices that will be in the network.

16. Which of the following would not be considered when selecting a potential location for a wiring closet?
a. Identify a secure location close to the POP.
*b. Determine the exact number of wiring closets needed for the network.
c. Determine the location of the building's communication facilities.
d. Make an initial selection of potential locations based on EIA/TIA-569 specifications.

17. What is the name for the most centrally located wiring closet in a LAN with an extended star typology?
a. Catchment area

*b. Main distribution facility
c. Intermediate distribution facility
d. Repeated distribution facility

18. Where should the main distribution facility (MDF) be located if a LAN with an extended star topology is used in a multistory building?
a. Next to the POP
b. On the first floor
*c. On one of the middle floors
d. In the basement

19. Where should a repeater be located in a LAN with an extended star topology?
a. Catchment area
b. Main distribution facility
*c. Intermediate distribution facility
d. Repeated distribution facility

20. What network device is used in an extended star topology when the catchment area of one wiring closet is not enough?
*a. Repeater
b. Backoff
c. Terminator
d. Suppressor

21. What type of cabling provides interconnections between wiring closets, wiring closets and the POP, and between buildings that are part of the same LAN?
a. Token Ring cabling
*b. Backbone cabling
c. Coaxial cabling
d. Horizontal cabling

22. What type of cabling is used to connect the POP to the MDF when an Ethernet LAN is in a multistory building?
*a. Backbone cabling
b. Coaxial cabling
c. Horizontal cabling
d. Token Ring cabling

23. What type of cabling is used to connect an MDF to IDFs when an Ethernet LAN is in a multistory building?
a. Token Ring cabling
*b. Backbone cabling
c. Coaxial cabling
d. Horizontal cabling

24. What type of cabling is used to connect IDFs on each floor to the various work areas when an Ethernet LAN is in a multistory building?
a. Backbone cabling
b. Coaxial cabling
*c. Horizontal cabling
d. Token Ring cabling

25. Which type of networking media is installed most often for backbone cabling?
a. 100 ohm unshielded twisted pair cable
b. 150 ohm shielded twisted pair cable
*c. 62.5/125 micron optical fiber cable
d. 50 ohm coaxial cable

26. Which of the following types of networking media is not recommended for backbone cabling?
a. 100 ohm unshielded twisted-pair cable
b. 150 ohm shielded twisted-pair cable
c. 62.5/125-micron optical-fiber cable
*d. 50 ohm coaxial cable

27. What kind of connection is used in a wiring closet where the horizontal cabling connects to a patch panel that is connected by backbone cabling to the main distribution facility?
*a. Horizontal cross-connect
b. Vertical cross-connect
c. Intermediate cross-connect
d. Main cross-connect

28. What kind of connection is used in a wiring closet that serves as the most central point in a star topology and where LAN backbone cabling connects to the Internet?
a. Horizontal cross-connect
b. Vertical cross-connect
c. Intermediate cross-connect
*d. Main cross-connect

29. What kind of connection is used in an IDF that connects the horizontal cross-connect to the main cross-connect?
a. Horizontal cross-connect
b. Vertical cross-connect
*c. Intermediate cross-connect
d. Main cross-connect

30. What is the maximum distance for backbone cabling if single-mode, fiber-optic cable is used to connect the horizontal cross-connect to the main cross-connect?
a. 500 meters
b. 1000 meters
c. 2500 meters
*d. 3000 meters

31. What is the maximum distance for backbone cabling if single-mode, fiber-optic cable is used to connect the intermediate cross-connect to the main cross-connect?
a. 500 meters
b. 1000 meters
*c. 2500 meters
d. 3000 meters

32. What is the maximum distance for backbone cabling if single-mode, fiber-optic cable is used to connect the horizontal cross-connect to the intermediate cross-connect?
*a. 500 meters
b. 1000 meters
c. 2500 meters
d. 3000 meters

Engineering Journal and Workbook, Vol. 1 - Chapter 10 - Layer 3: Routing and Addressing
1. Which layer of the OSI model uses the Internet Protocol addressing scheme to determine the best way to move data from one place to another?
a. Physical layer
b. Data link layer

*c. Network layer
d. Transport layer

2. What function allows routers to evaluate available routes to a destination and to establish the preferred handling of a packet?
a. Data linkage
*b. Path determination
c. SDLC interface protocol
d. Frame Relay

3. IP addresses are necessary for which of the following reasons?
*a. To identify a machine on a network and the network to which it is attached
b. To identify a machine on a network
c. To identify the network
d. To keep track of whom is on a network

4. Which of the following best describes a network address on the Internet?
a. All four octets in the address are different.
*b. Each address is unique.
c. The first three octets can be the same, but the last one must be different.
d. Two of the four octets can be the same, but the other two have to be different.

5. Who assigns the network portion of every IP address?
a. The local network administrator
b. The person who owns the computer
*c. The Network Information Center
d. The host network administrator

6. The network number plays what part in an IP address?
*a. Specifies the network to which the host belongs
b. Specifies the identity of the computer on the network
c. Specifies which node on the subnetwork is being addressed
d. Specifies which networks the device can communicate with

7. The host number plays what part in an IP address?
a. Designates the identity of the computer on the network
*b. Designates which node on the subnetwork is being addressed
c. Designates the network to which the host belongs
d. Designates which hosts the device can communicate with

8. A class "A" address is given to what sort of organization?
a. An individual
b. A medium-size company
c. A large corporation
*d. A government

9. In a class "A" address, how many of the octets are assigned by InterNIC?
*a. The first octet is assigned by InterNIC.
b. The first and second octet are assigned by InterNIC.
c. The first, second, and third octets are assigned by InterNIC.
d. All the octets are assigned by InterNIC.

10. In a class "A" address, the value of the first octet can equal which of the following?
*a. The value of first octet is 0 through 127.
b. The value of first octet is 128 through 191.

c. The value of first octet is 192 through 223.
d. The value of first octet is 192 through 255.

11. A class "B" address is given to what sort of organization?
a. An individual
*b. A medium size company
c. A large corporation
d. A government

12. In a class "B" address, how many of the octets are assigned locally?
a. The first octet is assigned locally.
b. The second octet is assigned locally.
c. The second and third octets are assigned locally.
*d. The third and fourth octets are assigned locally.

13. The following address is of which class? Address = 129.21.89.76
a. A class "A" address.
*b. A class "B" address.
c. A class "C" address.
d. This address could not be used.

14. A class "C" address is given to what sort of organization?
*a. An individual
b. A medium size company
c. A huge corporation
d. A government

15. Which of the following addresses is a class "C" address?
a. 129.219.95.193
*b. 209.101.218.30
c. 151.13.27.38
d. 190.119.15.17

Engineering Journal and Workbook, Vol. 1 - Chapter 11 - Layer 3: Routing Protocols
1. What is the Address Resolution Protocol?
a. Network protocol used to resolve device conflicts
*b. Internet protocol used to map an IP address to a MAC address
c. Network protocol used to identify the location of unauthorized users
d. Internet protocol used to uniquely identify a user on a specific network

2. What must a data packet contain to be passed from the network layer to higher levels of the OSI model?
a. A destination MAC address and a source IP address
*b. A destination MAC address and a destination IP address
c. A destination IP address or a source MAC address
d. Either a destination IP address or a destination MAC address

3. What happens if a data packet lacks a destination IP?
a. The data packet is sent to the RARP server that traces the data packet back to its source.
b. The MAC address takes priority and the data packet is passed up to the next network layer.
c. The ARP tables will be consulted to resolve any conflict,
*d. Data packets will not be passed to the next higher network layer.

4. What happens if a data packet lacks a MAC address?
a. The data packet is sent to the RARP server that traces the data packet back to its source.

b. The IP address takes priority and the data packet is passed up to the next higher network layer.
c. The ARP tables will be consulted to resolve any conflict.
*d. Data packets will not be passed to the next higher network layer.

5. What happens if the ARP table maps the destination IP address to the destination MAC address?
a. The data packet is sent to the RARP server.
b. The source broadcasts the IP address to all devices.
*c. The IP address is bound with the MAC address.
d. The network traffic is reduced and response times decreased.

6. What initiates an ARP request?
a. A device is unable to locate the destination IP address in its ARP table.
b. The RARP server in response to a malfunctioning device.
c. A diskless workstation with an empty cache.
*d. A device is unable to locate the destination MAC address in its ARP table.

7. What happens if a device is unable to locate the destination MAC address in its ARP table?
*a. An ARP request is sent.
b. The RARP server is consulted.
c. The destination IP address is used instead.
d. A data packet is sent to the dummy terminal.

8. What is a header?
a. IP address of the source device placed at the beginning of the data packet
b. Route the data packet takes through the network when it follows a predetermined path
*c. Control information placed before data when encapsulating that data for network transmission
d. Protocol to convert information from one stack to another at the application layer

9. What is a frame?
*a. Logical grouping of information sent as a data link layer unit over a transmission medium
b. Location where ARP tables are stored on a device
c. Data packet sent to a diskless workstation
d. Destination MAC and IP address bound together as a data packet

10. What are the header and trailer referred to as?
*a. Frame
b. ARP reply
c. IP address
d. RARP reply

11. Which best describes the function of a frame?
a. Binding of MAC and IP addresses
*b. Used for synchronization and error control
c. Querying of all devices on the network
d. Consulting the ARP tables to look up addresses

12. What is used for synchronization and error control?
a. Trailer
b. Header
*c. Frame
d. Protocol

13. Which best describes the structure of the ARP request frame?
a. MAC and IP address
b. Destination IP address and source IP address
*c. Frame header and ARP message
d. Addresses and trailer

14. What are the two parts of the frame header called?
*a. MAC header and IP header
b. Source address and ARP message
c. Destination address and RARP message
d. Request and data packet

15. Which best describes RARP?
a. Finds MAC addresses based on IP addresses
b. Calculates of shortest route between source and destination
*c. Finds IP addresses based on MAC addresses
d. Reduces network traffic by maintaining constant contact with all network devices

16. Why is a RARP request made?
*a. A source knows its MAC address but not its IP address.
b. The data packet needs to find the shortest route between destination and source.
c. The administrator needs to manually configure the system.
d. A link in the network faults and a redundant system must be activated.

17. Which of the following devices build ARP tables?
a. Hubs
*b. Routers
c. Data links
d. Encoders

18. Which best defines a gateway?
a. A network device that has an IP address and maintains ARP tables
b. A device that connects one network to another network
*c. A device that performs an application layer conversion of information from one stack to another
d. A device that cleans and amplifies signals

Engineering Journal and Workbook, Vol. 1 - Chapter 12 - Layer 4: The Transport Layer
1. Which layer of the OSI model provides transport services from the host to the destination?
a. Application
b. Presentation
c. Session
*d. Transport

2. Which best describes the function of the transport layer?
a. Establishes, manages, and terminates applications
*b. Provides transport services from the host to the destination
c. Supports communication between programs like electronic mail, file transfer, and Web browsers
d. Translates between different data formats such as ASCII and EBCDIC

3. Which best describes flow control?
a. A method to manage limited bandwidth
b. A method of connecting two hosts synchronously

*c. A method to ensure data integrity
d. A method to check data for viruses prior to transmission

4. Which best describes flow control?
a. Checks data packets for integrity and legitimacy prior to transmission
b. Avoids traffic backup by cycling host quickly through alternate send and receive modes during peak traffic periods
c. Connects two hosts over an exclusive high-speed link for critical data transfer
*d. Avoids the problem of a host at one side of the connection, overflowing the buffers in the host at the other side

5. Which of the following occurs in the transport layer when a connection is first established between computers in network?
a. Acknowledgment and retransmission
b. Encapsulation and broadcasting
*c. Synchronization and acknowledgment
d. Recovery and flow control

6. Which of the following occurs in the transport layer when data congestion occurs?
a. Broadcasting
b. Windowing
c. Error recovery
*d. Flow control

7. Which layer of the OSI model handles flow control and error recovery?
a. Application
b. Presentation
*c. Transport
d. Network

8. What technique allows multiple applications to share a transport connection?
a. Broadcasting
b. Synchronicity
c. Encapsulation
*d. Segmentation

9. Which best describes segmentation?
a. Breaks data into smaller packets for faster transmission
b. Switches hosts from send to receive mode continuously during peak traffic periods
*c. Allows multiple applications to share a transport connection
d. Transfers data from the presentation layer to the network layer for encoding and encapsulation

10. What method controls the amount of information transferred end-to-end and helps enable TCP reliability?
a. Broadcasting
*b. Windowing
c. Error recovery
d. Flow control

11. If the window size is set to one, when would an acknowledgment of data packet receipt be sent back to the source?
*a. After one packet
b. After two packets
c. After three packets
d. After four packets

12. If the window size is set to three, when would an acknowledgment of data packet receipt be sent back to the source?
a. After one packet
*b. After three packets
c. After six packets
d. After nine packets

Engineering Journal and Workbook, Vol. 1 - Chapter 13 - Layer 5: The Session Layer
1. Which layer of the OSI model establishes, manages, and terminates communication between applications?
a. Application
b. Presentation
*c. Session
d. Transport

2. Which best describes the function of session layer?
*a. Establishes, manages, and terminates communications between applications
b. Supports communication between programs like electronic mail, file transfer, and Web browsers
c. Provides transport services from the host to the destination
d. Translates between different data formats such as ASCII and EBCDIC

Engineering Journal and Workbook, Vol. 1 - Chapter 14 - Layer 6: The Presentation Layer
1. Which layer of the OSI model layer can translate between different data formats such as ASCII and EBCDIC?
a. Application
*b. Presentation
c. Session
d. Transport

2. Which layer of the OSI model layer guides how graphic images, sound, and video are presented?
a. Application
*b. Presentation
c. Session
d. Transport

3. Which best describes the function of the presentation layer?
a. Establishes, manages, and terminates applications
b. Supports communication between programs like electronic mail, file transfer, and Web browsers
*c. Guides how graphic images, sound, and video are handled
d. Provides transport services from the host to the destination

4. Which best describes the function of the presentation layer?
a. Establishes, manages, and terminates applications
b. Supports communication between programs like electronic mail, file transfer, and Web browsers
c. Provides transport services from the host to the destination
*d. Translates between different data formats such as ASCII and EBCDIC

5. Which layer of the OSI model layer handles data encryption?
a. Application
*b. Presentation
c. Session

d. Transport

6. ASCII, encryption, QuickTime, JPEG are all typical of which layer?
*a. Presentation
b. Transport
c. Application
d. Session

Engineering Journal and Workbook, Vol. 1 - Chapter 15 - Layer 7: The Application Layer
1. Which layer of the OSI model supports communication between programs such as electronic mail, file transfer, and Web browsers?
*a. Application
b. Presentation
c. Session
d. Transport

2. Which best describes the function of the application layer?
a. Establishes, manages, and terminates applications
*b. Supports communication between programs like electronic mail, file transfer, and Web browsers
c. Provides transport services from the host to the destination
d. Translates between different data formats such as ASCII and EBCDIC

3. Which is a network application?
*a. Electronic mail
b. Word processor
c. Web browser
d. Spreadsheet

4. Which is a computer application?
a. Remote access
b. File transfer
*c. Web browser
d. Electronic mail

5. Electronic mail and file transfer are typical functions of which layer in the OSI model?
a. Transport
b. Network
*c. Application
d. Presentation

Engineering Journal and Workbook, Vol. 1 - Chapter 16 - OSI Review
1. What networking term is used when a corporation, agency, school, or other organization works together to tie its data, communication, computing, and file servers?
a. Encapsulation
*b. Enterprise
c. Interconnectivity
d. Protocol

2. Which best describes the function of the data link layer?
a. Provides network services to user applications
*b. Uses a MAC address to provide physical transmission across media and handles error notification, network topology, and flow control
c. Provides data representation and code formatting
d. Provides electrical, mechanical, procedural, and functional means for activating and maintaining the link between systems

3. Which best describes the function of the network layer?
a. Provides electrical, mechanical, procedural and functional means for activating and maintaining the link between systems
b. Establishes, maintains, and manages sessions between applications
*c. Uses the Internet Protocol addressing scheme to determine the best way to move data from one place to another
d. Uses a MAC address to provide physical transmission across media and handles error notification, network topology, and flow control

4. Which of the following does not accurately describe how peer-to-peer communication works?
a. Each layer of the OSI model uses its own layer protocol to communicate with its peer layer in the other system.
b. Each layer's protocol exchanges information, called protocol data units, between peer layers.
c. The transport layer of TCP communicates with the peer TCP function using segments.
*d. Peer communication is achieved by using the services of the layers above it.

5. Which of the following correctly describes the five conversion steps of data encapsulation when one computer sends an e-mail message to another computer?
*a. Data-segments-packets-frames - bits
b. Bits-frames-packets-segments-data
c. Packets-segments-data- bits-frames
d. Segments-packets-frames-bits-data

6. Which best describes the structure of an encapsulated data packet?
a. Segment header, network header, data, frame trailer
b. Segment header, network header, data, segment trailer.
*c. Frame header, network header, data, frame trailer
d. Frame header, segment header, data, segment trailer

7. An e-mail message is sent from Host A to Host B on a LAN. To send this message, the data must be encapsulated. Which of the following best describes the first step of data encapsulation?
*a. Alphanumeric characters are converted into data
b. Message is segmented into easily transportable chunks.
c. A network header is added to the message (source and destination addresses)
d. The message is converted into binary format

8. An e-mail message is sent from Host A to Host B on a LAN. To send this message, the data must be encapsulated. Which of the following best describes the last step of data encapsulation?
a. Alphanumeric characters are converted into data
b. Message is segmented into easily transportable chunks
c. A network header is added to the message (source and destination addresses)
*d. The message is converted into binary format

9. An e-mail message is sent from Host A to Host B on a LAN. To send this message, the data must be encapsulated. Which of the following best describes what happens after the packet is put into a frame?
a. Alphanumeric characters are converted into data.
b. Message is segmented into easily transportable chunks.
c. A network header is added to the message (source and destination addresses).
*d. The message is converted into binary format.

10. An e-mail message is sent from Host A to Host B on a LAN. To send this message, the data must be encapsulated. Which of the following best describes what happens after a packet is constructed?
a. The packet is transmitted along the medium.
*b. The packet is put into a frame.
c. The packet is segmented into frames.
d. The packet is converted to binary format.

11. An e-mail message is sent from Host A to Host B on a LAN. To send this message, the data must be encapsulated. Which of the following best describes what happens after the e-mail's alphanumeric characters are converted into data?
a. Data is converted into binary format.
b. Data has a network header added.
*c. Data is segmented into smaller chunks.
d. Data is put into a frame.

Engineering Journal and Workbook, Vol. 1 - Chapter 17 - LANs: Layers 1, 2, 3
1. Which of the following is not a major characteristic of a LAN?
*a. Operates over a wide geographic area
b. Provides multiple users with access to high-bandwidth media
c. Provides full-time connectivity to local services
d. Connects physically adjacent devices

2. Which best describes the function of a bridge?
a. Provides for internetworking and broadcast control
*b. Connects LAN segments and helps filter traffic
c. Concentrates LAN connections and allows use of twisted-pair copper media
d. Offers full duplex, dedicated bandwidth to segments

3. Which best describes the function of a router?
a. Connects LAN segments and helps filter traffic.
b. Concentrates LAN connections and allows use of twisted-pair copper media
*c. Provides for internetworking and broadcast control
d. Offers full duplex, dedicated bandwidth to segments

4. Which of the following correctly describes the difference between a bridge and a router?
a. Bridging occurs at the network layer of the OSI model, and routing occurs at the data link layer.
*b. Bridges use MAC addresses, and routers use logical addresses.
c. Bridges use addresses assigned by network administrators, and routers use addresses assigned by hardware manufacturers.
d. Bridges provide for internetworking, and routers filter network traffic.

5. Which best describes the function of a hub?
a. Provides for internetworking and broadcast control
b. Connects LAN segments and helps filter traffic
c. Offers full duplex, dedicated bandwidth to segments
*d. Concentrates LAN connections and allows use of twisted-pair copper media

6. Which best describes the function of an Ethernet switch?
a. Connects LAN segments and helps filter traffic
*b. Offers full duplex, dedicated bandwidth to segments

c. Concentrates LAN connections and allows use of twisted-pair copper media
d. Provides for internetworking and broadcast control

7. What are the most common media used in networking today?
*a. Fiber optic, coaxial, unshielded twisted pair
b. Fiber optic, shielded twisted pair
c. Fiber optic, telephone, coaxial
d. Twisted pair, telephone

8. What are the most common LAN technologies used in networking today?
a. Star, Token Ring, DECnet
*b. Ethernet, Token Ring, FDDI
c. Ethernet, DECnet, ARCnet
d. Vines, Token Ring, SDDI

9. What is the operating signaling rate of Ethernet?
a. 1 Mbps
*b. 10 Mbps
c. 50 Mbps
d. 100 Mbps

10. What is another name for 10Base5 cabling?
*a. Thick Ethernet
b. Telephone wiring
c. Thin Ethernet
d. Coaxial Ethernet

11. Using 10Base5 cabling, what is the maximum network segment possible?
a. 185 meters
b. 250 meters
*c. 500 meters
d. 1000 meters

12. What type of cabling media is used for 10Base5?
a. Fiber optic or unshielded twisted pair
b. Fiber optic or coaxial
c. Unshielded twisted pair
*d. Coaxial

13. What type of cabling media is used for 10Base T?
a. Fiber optic or unshielded twisted pair
b. Fiber optic or coaxial
*c. Twisted pair
d. Coaxial

Engineering Journal and Workbook, Vol. 1 - Chapter 18 - Layers 4, 5, 6, and 7
1. Which are the four upper layers of the OSI model?
*a. Application, presentation, session, transport
b. Application, session, network, physical
c. Physical, data link, network, transport
d. Physical, network, transport, application

2. Which best describes the function of the application layer?
a. Establishes, manages, and terminates applications
*b. Supports communication between programs like electronic mail, file transfer, and Web browsers
c. Provides transport services from the host to the destination
d. Translates between different data formats such as ASCII and EBCDIC

3. Which is a network application?
*a. Electronic mail
b. Word processor
c. Web browser
d. Spreadsheet

4. Which is a computer application?
a. Remote access
b. File transfer
*c. Web browser
d. Electronic mail

5. Which best describes the function of the presentation layer?
a. Establishes, manages, and terminates applications
b. Supports communication between programs like electronic mail, file transfer, and Web browsers
c. Provides transport services from the host to the destination
*d. Translates between different data formats such as ASCII and EBCDIC

6. Which layer of the OSI model layer handles data encryption?
a. Application
*b. Presentation
c. Session
d. Transport

7. ASCII, encryption, QuickTime, JPEG are all typical of which layer?
*a. Presentation
b. Transport
c. Application
d. Session

8. Which file formats are associated with the presentation layer?
a. Doc, dir, ppg, pm6
*b. Tiff, QuickTime, midi, mpeg, gif
c. Tiff, doc, dir, midi, pm6
d. xls, doc, ppt, pdf

9. Which best describes the function of session layer?
*a. Establishes, manages, and terminates communications between applications
b. Supports communication between programs like electronic mail, file transfer, and Web browsers
c. Provides transport services from the host to the destination
d. Translates between different data formats such as ASCII and EBCDIC

10. Which of the following best describe the functions of the transport layer?
a. Establishes, manages, and terminates applications
*b. Provides transport services from the host to the destination
c. Supports communication between programs like electronic mail, file transfer, and Web browsers
d. Translates between different data formats such as ASCII and EBCDIC

11. Which best describes flow control?
a. A method to manage limited bandwidth
b. A method of connecting two hosts synchronously
*c. A method to ensure data integrity
d. A method to check data for viruses prior to transmission

12. Which of the following occurs in the transport layer when a connection is first established between computers in network?
a. Acknowledgment and retransmission
b. Encapsulation and broadcasting
*c. Synchronization and acknowledgment
d. Recovery and flow control

Engineering Journal and Workbook, Vol. 1 - Chapter 19 - WANs
1. Which of the following best describes a WAN?
*a. Connects LANs that are separated by a large geographic area
b. Connects workstations, terminals, and other devices in a metropolitan area
c. Connects LANs within a large building
d. Connects workstations, terminals, and other devices within a building

2. Which of the following are examples of WANs?
a. Token Ring, ARCNet
*b. Frame Relay, SMDS
c. Star, Banyan VINES
d. CSU/DSU, ARCView

3. What service does a WAN provide to LANs?
a. High-speed multiple access to data networks
b. IP addressing and secure data transfer
*c. Exchanging data packets between routers and the LANs those routers support
d. Direct routing with error checking

4. What type of connections do WANs use that LANs typically don't use?
a. Parallel, lower speed
b. Multiple, higher speed
c. Multiple, lower speed
*d. Serial, lower speed

5. At which layers of the OSI model does a WAN operate?
a. Physical and application
*b. Physical and data link
c. Data link and network
d. Data link and presentation

6. Which layers of the OSI models do WAN standards describe?
a. Data link and network
b. Data link and presentation
c. Physical and application
*d. Physical and data link

7. How do WANs differ from LANs?
a. Typically exist in defined geographic areas
b. Provide high-speed multiple access services
c. Use tokens to regulate network traffic
*d. Use services of common carriers

8. How do WANs differ from LANs?
*a. Emphasize access over serial interfaces operating at lower speeds
b. Provide high-speed multiple access services
c. Typically exist in defined geographic areas
d. Use tokens to regulate network traffic

9. How are operational and functional connections for WANs obtained?
a. From your local telephone company

b. From InterNIC
*c. From regional Bell operating companies (RBOC)
d. From the WWW Consortium

10. What do the WAN physical layer standards describe?
a. Interface between SDLC and HDLC
b. How frames are sent and verified
c. How voice and data traffic are routed
*d. Interface between DTE and DCE
11. Which best describes what WAN data link protocols define?
*a. How frames are carried between systems on a single data link
b. Methods for determining optimum path to a destination
c. How data packets are transmitted between systems on multiple data links
d. Methods for mapping IP addresses to MAC addresses

12. Which is a WAN data link protocol?
a. TCP/IP
*b. Point-to-point
c. EIGRP
d. OSPF

13. Which is a WAN data link protocol?
a. TCP/IP
b. OSPF
c. EIGRP
*d. Frame relay

14. Which best describes data terminal equipment (DTE)?
a. Physical connection between networks and users
b. Generates clocking signals to control network traffic
*c. Device at the user end of a network
d. Physical devices such as modems and interface cards

15. Which is an example of data terminal equipment (DTE)?
a. Interface card
b. Modem
*c. Computer
d. CSU/DSU

16. Which best describes data circuit terminating equipment (DCE)?
a. Device at the user end of a network
b. Serves as data source and/or destination
c. Physical devices such as protocol translators and multiplexers
*d. Physical connection between networks and users

17. Which is an example of data circuit terminating equipment (DCE)?
a. Multiplexer
*b. Modem
c. Translator
d. Computer

18. Which best describes High-Level Data Link Control (HDLC)?
a. Digital service that transmits voice and data over existing phone lines
b. Uses high quality digital facilities - fastest WAN protocol
c. Provides router-to-router and host-to-network connections over synchronous and asynchronous circuits
*d. Supports point-to-point and multipoint configurations and uses frame characters and checksums

19. Which WAN protocol can be described as supporting point-to-point and multipoint configurations?
*a. HDLC
b. Frame Relay
c. PPP
d. ISDN

20. Which WAN protocol can be described as using frame characters and checksums?
a. ISDN
b. Frame Relay
c. PPP
*d. HDLC

21. Which best describes Frame Relay?
*a. Uses high quality digital facilities - fastest WAN protocol
b. Supports point-to-point and multipoint configurations and uses frame characters and checksums
c. Digital service that transmits voice and data over existing telephone lines
d. Provides router-to-router and host-to-network connections over synchronous and asynchronous circuits

22. Which WAN protocol can be described as using high quality digital facilities?
a. HDLC
*b. Frame Relay
c. PPP
d. ISDN

23. Which WAN protocol can be described as the fastest WAN protocol?
a. HDLC
b. PPP
*c. Frame Relay
d. ISDN

24. Which best describes PPP?
a. Uses high quality digital facilities - fastest WAN protocol
b. Supports point-to-point and multipoint configurations and uses frame characters and checksums
*c. Provides router-to-router and host-to-network connections over synchronous and asynchronous circuits
d. Digital service that transmits voice and data over existing telephone lines

25. Which WAN protocol can be described as providing router-to-router and host-to-network connections over synchronous and asynchronous circuits?
a. HDLC
b. Frame Relay
*c. PPP
d. ISDN

26. Which best describes ISDN?
*a. Digital service that transmits voice and data over existing phone lines
b. Provides router-to-router and host-to-network connections over synchronous and asynchronous circuits
c. Uses high quality digital facilities - fastest WAN protocol
d. Supports point-to-point and multipoint configurations and uses frame characters and checksums

27. Which WAN protocol can be described as a digital service that transmits voice and data over existing telephone lines?
a. HDLC
b. Frame Relay
c. PPP
*d. ISDN

Engineering Journal and Workbook, Vol. 1 - Chapter 20 - Routing
1. What function allows routers to evaluate available routes to a destination and to establish the preferred handling of a packet?
a. Data linkage
*b. Path determination
c. SDLC interface protocol
d. Frame Relay

2. What information is used by routing services to evaluate network paths?
a. MAC addresses
b. Name server tables
*c. Network topology
d. ARP requests

3. Where can routing services obtain the network topology information needed to evaluate network paths?
a. From RARP and ARP tables
b. From network name servers
c. From bridges talking to routers during messaging sessions
*d. From information collected by dynamic processes

4. What two functions do a router use to relay packets from one data link to another?
a. Link-state testing and convergence
b. Convergence and switching
c. Path determination and link-state testing
*d. Path determination and switching

5. How does the network layer send packets from the source to the destination?
*a. Uses an IP routing table
b. Uses ARP responses
c. Refers to a name server
d. Refers to the bridge

6. What happens at the router during a switching operation?
a. The router changes from link-state to distance-vector mode.
*b. A packet accepted on one interface is forwarded to another interface or port that reflects the best path to the destination.
c. A test message is sent over the proposed route to make sure it is operational.
d. The received packet has the header stripped, read, and a new header attached listing the next stop on the route.

7. Why is it important to prevent unnecessary broadcasts over the entire internetwork?
*a. Broadcasts incur processing overhead and waste network capacity.
b. Broadcasts cannot be sent as multiphase transmissions so routers must change modes to deal with them.
c. Broadcasts are common causes of collisions and should be avoided whenever possible.

d. Broadcasts can quickly relay bad routing tables throughout an internetwork.

8. How does the network layer avoid unnecessary broadcast messages?
a. By using error-trapping algorithms
*b. By using consistent end-to-end addressing
c. By using name servers to do look-up functions
d. By using link-state detection

9. What problem for the network layer does using consistent end-to-end addressing solve?
a. Reduces chance of infinite loops
b. Avoids split horizons
*c. Avoids unnecessary broadcast messages
d. Reduces count to infinity problems

10. What are the two parts of an address that routers use to forward traffic through a network?
*a. Network address and host address
b. Network address and MAC address
c. Host address and MAC address
d. MAC address and subnet mask

11. Which network device uses the network address to define a path?
a. Bridge
*b. Router
c. Hub
d. Server

12. How does a router make path selections?
*a. By looking at the network portion of the address
b. By looking at the host portion of the address
c. By looking at mean distances between routers
d. By looking at the port or device on the network

13. What does the host address specify?
a. Type of device
b. Distance to the nearest network hub
*c. Specific port or device on the network
d. Network the device is on

14. How does the host portion of an address help a router in its path determination function?
a. Defines a path through the network
b. Contains distance information that can be used to calculate the shortest route
*c. Refers to a specific port on the router that leads to an adjacent router in that direction
d. Tells the router the type of device and its distance from the router

15. What does the switching function of a router do?
a. Allows greater throughput and capacity by multitasking
*b. Allows the router to accept a packet on one interface and forward it on another interface
c. Exchanges the old header of a data packet for a new header that includes path information for the next router
d. Changes the router from receive and send mode to broadcast mode when part of the network fails

16. Which best describes a routed protocol?

*a. Provides enough information to allow a packet to be forwarded from host to host
b. Provides information necessary to pass data packets up to the next highest network layer
c. Allows routers to communicate with other routers to maintain and update address tables
d. Allows routers to bind MAC and IP address together

17. Which is an example of a routed protocol?
a. RIP
*b. IP
c. IGRP
d. OSPF

18. Which best describes a routed protocol?
a. Passes data packets up to the next highest network layer
b. Binds MAC and IP addresses together
*c. Defines the format and use of fields within a packet
d. Exchanges routing tables and shares routing information between routers

19. Which best describes a routing protocol?
a. Provides information to allow a packet to be forwarded from host to host
b. Binds MAC and IP addresses together
c. Defines the format and use of fields within a data packet
*d. Allows routers to communicate with other routers to maintain and update address tables

20. Which best describes a routing protocol?
*a. A protocol that accomplishes routing through the implementation of an algorithm
b. A protocol that specifies how and when MAC and IP addresses are bound together
c. A protocol that defines the format and use of fields within a data packet
d. A protocol that allows a packet to be forwarded from host to host

21. Which best describes the difference between a routed versus a routing protocol?
a. Routed protocols are used between routers to maintain tables, while routing protocols are used between routers to direct traffic.
b. Routed protocols use distance-vector algorithms, while routing protocols use link-state algorithms.
*c. Routed protocols are used between routers to direct traffic, while routing protocols used between routers to maintain tables.
d. Routed protocols use dynamic addressing, while routing protocols use static addressing.

22. What happens when a data-link frame is received on a router interface?
a. The packet header is removed and a new one with additional routing information is attached.
b. A frame header is sent to check the path integrity prior to sending the packet on towards its destination.
c. The packet is sent to the nearest bridge that forwards it to the next router or the final destination.
*d. The header is examined to determine the destination network and consults the routing table to see which outgoing interface is associated with that network.

23. What happens after a router has matched the destination network with an outgoing interface?
a. The packet is sent to the nearest bridge that forwards it to the next router or the final destination.
b. A frame header is sent to check the path integrity prior to sending the packet on towards its destination.
*c. The packet is queued for delivery to the next hop in the path.
d. The packet header is removed and a new one with additional routing information is attached.

24. Which of the following best describes a data-link frame header?
*a. Controls information placed in front of data when it is readied for network transmission
b. Broadcasts message sent over the network to warn routers of network failures in specific links
c. Diagnostic message used to check network links for problems
d. Packets sent by routers to other routers to update routing tables

25. What is the control information placed in front of data in a data packet called?
a. Addressing
*b. Header
c. Trailer
d. Encapsulate

26. Which of the following best describes a hop?
*a. Passage of a data packet between two routers
b. Device which connects two or more networks together
c. Shortest distance between source and destination
d. Exchange and copying of ARP tables between two noncontiguous network devices

27. What is the passage of a data packet between two routers called?
a. Exchange
*b. Hop
c. Transmittal
d. Signaling

28. Which best describes multiprotocol routing?
a. Ability to send packets simultaneously out different ports
b. Ability to shift from static to dynamic routing as network loads change
*c. Ability to maintain routing tables for several routed protocols concurrently
d. Ability to rewrite frame headers to formats compatible with different networks

29. What does multiprotocol routing allow routers to do?
a. Rewrite frame headers to formats compatible with different networks
b. Shift from static to dynamic routing as network loads change
c. Send packets simultaneously out different ports
*d. Deliver packets from several routed protocols over the same data links

30. Which best describes static routing?
*a. A route that is manually entered into a routing table by the network administrator
b. A route received from the local name server
c. A route that is automatically entered into a routing table
d. An optimum route between devices as determined by the RARP table

31. Which best describes dynamic routing?
*a. Automatic updating of routing tables whenever new information is received from the internetwork
b. Manual entry of data into a routing table by the network administrator
c. Following preset paths from device to device
d. RARP server determines optimum route between devices and copies those routes into a routing table

32. What type of routing occurs without the intervention of a network administrator?
a. Default
*b. Dynamic
c. Progressive
d. Static

33. What is one advantage of static routing?
*a. More secure as parts of an internetwork can be hidden
b. Requires little active management by the network administrator
c. Adjusts automatically to topology or traffic changes
d. Can compensate for router failures by using alternate paths

34. What is one advantage for using static routing on a stub network?
a. Compensates for route failures by using alternate paths
b. Requires little active management by the network administrator
c. Adjusts automatically to topology or traffic changes
*d. Avoids the network overhead required by dynamic routing

35. What are the two major classes of routing algorithms?
a. Check sum and link state
b. Check sum and traffic load
c. Distance vector and traffic load
*d. Distance vector and link state

36. Which best describes a distance-vector protocol?
*a. Determines the direction and distance to any link in the internetwork
b. Each router maintains a complex database of internetwork topology information
c. Computationally rather complex
d. Method of routing which prevents loops and minimizes counting to infinity

37. What do distance-vector algorithms require of routers?
a. Default routes for major internetwork nodes in case of corrupted routing tables
*b. Send its entire routing table in each update to its neighbors
c. Fast response times and ample memory
d. Maintain a complex database of internetwork topology information

38. Why is it important in distance-vector algorithms for routers to send copies of their routing table to neighboring routers?
a. To prevent error propagation
b. To stop routing loops
c. To enable split horizon mapping
*d. To communicate topology changes quickly

39. What is a major drawback of distance-vector algorithms?
a. More network traffic
b. Computationally difficult
*c. Prone to routing loops

d. Cannot implement hold-down timers

40. What is one disadvantage of distance-vector algorithms?
*a. Routers do not know the exact topology of an internetwork, only distances between points
b. More network traffic
c. Computationally difficult
d. Cannot implement hold-down timers

41. What is one advantage of distance-vector algorithms?
a. Not likely to count to infinity
b. Implements easily on very large networks
c. Not prone to routing loops
*d. Computationally simpler

42. Which of the following best describes link-state algorithms?
*a. Recreate the exact topology of the entire internetwork
b. Require minimal computations
c. Determine distance and direction to any link on the internetwork
d. Use little network overhead and reduces overall traffic

43. Which of the following best describes link-state algorithms?
a. Use little network overhead and reduces overall traffic
*b. Each router broadcasts information about the network to all nodes on the network
c. Determine distance and direction to any link on the internetwork
d. Use little network overhead and reduces overall traffic

44. What is true about link-state routing algorithms?
a. Require less network traffic than distance-vector algorithms
b. Computationally rather simple
c. Require less router memory and slower response times
*d. Maintain full knowledge of distant routers and how they interconnect

45. Which best describes convergence?
a. When messages simultaneously reach a router and a collision occurs
b. When several routers simultaneously route packets along the same path
*c. When all routers in an internetwork have the same knowledge of the structure and topology of the internetwork
d. When several messages are being sent to the same destination

46. Which term is used to describe an internetwork state when all routers have the same knowledge of the structure and topology of the internetwork?
a. Congruence
b. Equivalence
c. Correspondence
*d. Convergence

47. Why is fast convergence a desirable attribute of a routing protocol?
*a. Reduces time period over which routers make incorrect routing decisions
b. Reduces network traffic
c. Reduces routing loop time
d. Reduces memory requirements of local routers

48. After a network topology change, what routing protocol characteristic reduces incorrect or wasteful routing decisions?
a. Symmetry
*b. Convergence
c. Equivalence

d. Correspondence

49. What is a routing loop?
a. A route to often requested destinations
b. A network path that is circular and has no branches
*c. A packet that cycles repeatedly through a constant series of network nodes
d. A process that routers go through when performing self-diagnostics

50. What is the process called where packets never reach their destination, but instead cycle repeatedly through the same series of network nodes?
a. Split horizon
b. End to end messaging
c. Convergence
*d. Routing loop

51. Why do routing loops occur?
*a. Slow convergence after a modification to the internetwork.
b. Split horizons are artificially created.
c. Network segments fail catastrophically and take other network segments down in a cascade effect.
d. Default routes were never established and initiated by the network administrator.

52. Why do routing loops occur?
a. Split horizons are artificially created.
*b. A network device fails and that information is only slowly passed to all the routers in the internetwork.
c. Default routes were never established and initiated by the network administrator.
d. Network segments fail catastrophically and take other network segments down in a cascade effect.

53. Why does the problem of counting to infinity occur?
a. Split horizon
b. Noncongruence
*c. Slow convergence
d. Router inequivalence

54. Which best describes the count to infinity problem?
*a. Routers continuously increment the hop count as a routing loop proceeds.
b. Packets cycle repeatedly through a constant series of network nodes.
c. During heavy traffic periods, freak collisions can occur and damage the packet headers.
d. Once a split horizon occurs, two sets of metrics exists for the same destination and neither matches that in the routing table.

55. How can the count to infinity problem be prevented?
a. By forcing a routing loop
b. By invoking a split horizon process
c. By tracking network traffic levels and regulating flow
*d. By imposing an arbitrary hop-count limit

56. How can the count to infinity problem be solved?
a. Initiate a routing loop
*b. Define infinity as some maximum number
c. Switch from distance-vector to link-state mode
d. Force a router convergence and reconciliation

57. What happens once the hop-count exceeds the maximum in a routing loop?
a. The loop ends and the data packet is returned to the source for retransmission later.
b. The default route is recalled and used.
*c. The network is considered unreachable and the loop ends.
d. A count to infinity is initiated and a split horizon invoked.

58. How can the count to infinity problem be prevented?
a. By using routing loops
b. By using split horizon routing systems
c. By increasing router memory
*d. By using hold-down timers

59. Which best describes hold-down timers?
a. Timer that synchronizes the router table update process
b. Time during which messages are held if network segment is temporarily unavailable
c. Time allowed before intervention to halt routing loop
*d. Time during which routers will neither send nor receive updated routing tables

60. Why are hold-down timers useful?
*a. They flush bad information about a route from all routers in the network.
b. They force all routers in a segment to synchronize switching operations.
c. They reduce the amount of network traffic during high traffic periods.
d. They provide a mechanism for bypassing failed sections of network.

61. When are routers placed in a hold-down state?
a. When a routing loop occurs
*b. When a link in a route fails
c. When a routing table becomes corrupted
d. When convergence occurs too slowly

62. How does a hold-down timer work?
a. By holding messages in routing loops for a given time period, the hold-down timer reduces network traffic at peak times.
b. When the hop count exceeds a fixed value, the hold-down timer holds the message until a split horizon is established.
*c. When a router receives an update indicating that a network is now inaccessible, the router marks the route and starts a hold-down timer.
d. When a count is started, a hold-down timer is started too, if after a given time period the count continues, the timer halts the process and returns control to the nearest router.

63. What are the major two link-state concerns?
a. Split horizons and convergence
*b. Processing and memory requirements
c. Routing loops and equivalence
d. Table copying and counting to infinity

64. Which of the following best describes link-state advertisement (LSA)?
a. Broadcast message in response to a convergence call
b. Broadcast message relaying state of data links (up or down) to all routers
*c. Broadcast packet that contains information about neighbors and path costs

d. Broadcast packet that is initiated by an active routing loop

65. What are LSAs used for?
a. To halt routing loops
b. To determine path metrics
c. To broadcast convergence calls
*d. To maintain routing tables of receiving routers

66. What is the most complex and important aspect of link-state routing?
*a. Making sure all routers get all the necessary LSA packets
b. Ensuring that convergence occurs rapidly
c. Avoiding routing loops during initial start up
d. Providing mechanisms for split horizons and count to infinity avoidance

67. What will happen if routers have different sets of LSAs?
a. A check sum procedure is initiated and faulty routing tables repaired.
*b. Routes become unreachable because routers disagree about a link.
c. A master comparison is forced and subsequent convergence on a single routing table occurs.
d. A broadcast message is sent with the master copy of the routing table to all routers.

68. What is one problem with link-state updating?
a. Easy to start a routing loop and subsequent count to infinity
b. Routers can become unreachable because they don't have a complete picture of the internetwork
*c. In synchronizing large networks, it is difficult to tell which updates are correct
d. If the master routing table is corrupted, the entire network will go down

69. What is one problem with link-state updating?
a. Routers can become unreachable because they don't have a complete picture of the internetwork
b. Easy to start a routing loop and subsequent count to infinity
c. If the master routing table is corrupted, the entire network will go down
*d. Order of router startup alters the topology learned

70. Which of the following is correct?
*a. Distance-vector routing gets all topological data from the routing tables of their neighbors, while link-state routing develops a map of the network by accumulating LSAs.
b. Distance-vector routing develops a map of the network, while link-state routing gets topological data from the routing tables of their neighbors.
c. Distance-vector routing requires lots of bandwidth and network overhead, while link-state routing requires considerably less.
d. Distance-vector routing has quick convergence time, while link-state routing has a slow convergence time and is therefore prone to routing loops.

71. Which of the following is correct?
a. Distance-vector routing requires lots of bandwidth and network overhead, while link-state routing requires considerably less.
*b. Distance-vector routing determines the best path by adding to the metric value it receives, while link-state routing has the routers calculating their own shortest path to destinations.

c. Distance-vector routing has quick convergence time, while link-state routing has a slow convergence time and is therefore prone to routing loops.
d. Distance-vector routing has the routers calculate their own shortest path to destinations, while link-state routing determines the best path by adding to the metric value it receives from its neighbors.

72. Which of the following is correct?
a. Distance-vector routing has a quick convergence time, while link-state routing has a slow convergence time and is therefore prone to routing loops.
b. Distance-vector routing requires lots of bandwidth and network overhead, while link-state routing requires considerably less.
*c. Distance-vector routing updates for topology changes with periodic table updates, while link-state routing updates are triggered by topology changes.
d. Distance-vector routing updates are triggered by topology changes, while link-state routing updates for topology changes with periodic scheduled table updates.

73. Which best describes hybrid routing?
*a. Uses distance vectors to determine best paths, but topology changes trigger routing table updates
b. Uses distance-vector routing to determine best paths between topology during high traffic periods
c. Uses topology to determine best paths but does frequent routing table updates
d. Uses topology to determine best paths but uses distance vectors to circumvent inactive network links

Engineering Journal and Workbook, Vol. 1 - Chapter 21 - Using the Router
1. What are the two modes of access to router commands for Cisco routers?
*a. User and privileged
b. User and guest
c. Privileged and guest
d. Guest and anonymous

2. Why are there two modes of access to router commands on Cisco routers?
a. One mode is for remotely working on the router, while the other mode is for directly working on the router via a console.
b. One mode, which has many automatic sequences, is for new users, while the other mode is for experienced users who can issue direct commands.
*c. One mode lets a number of users see what's happening on the router, while the other mode lets a few users change how the router operates.
d. One mode is for the initial router configuration and startup, while the other mode is for maintaining, updating, and changing the router after initial startup.

3. What can only be done in privileged mode on Cisco routers?
*a. Change the configuration
b. Enter commands
c. Check routing tables
d. Monitor performance

4. How do you switch from user to privileged mode on Cisco routers?
a. Type "admin" and enter a password.
b. Type "root" and enter a password.
*c. Type "enable" and enter a password.

d. Type "privileged" and enter a password.

5. What happens if you type "enable" on a Cisco router user interface?
a. Switch to user mode
b. Last command entered is activated
c. New LAN is added to the router table
*d. Switch to privileged mode

6. Which of the commands listed below is not available in the user access mode?
*a. Show
b. PPP
c. Trace
d. Ping

7. Which is the user-mode prompt for Cisco router user interfaces?
a. #
*b. >
c. <
d. |#

8. Which is the privileged mode prompt for Cisco router user interfaces?
*a. #
b. >
c. <
d. |#

9. How do you log out of a Cisco router user interface?
a. Type "Control-Q"
b. Type "quit"
*c. Type "exit"
d. Type "Control-X"

10. How can you get a list of commonly used commands from a Cisco router user interface?
a. Type "list"
b. Type "Control-C"
c. Type "Control-?"
*d. Type "?"

11. What does the "More" prompt at the bottom of a screen on a Cisco router user interface mean?
*a. Multiple screens are available as output.
b. Additional detail is available in the manual pages.
c. Multiple entries are required in the command.
d. Additional conditions must be stated.

12. How do you get to the next screen if "More" is indicated at the bottom of the current screen on a Cisco router user interface?
a. Press the page down key.
*b. Press the spacebar.
c. Press the end key.
d. Press the tab key.

13. Which keystroke(s) will automatically repeat the previous command entry on a Cisco router user interface?
a. Left arrow
b. Right arrow
c. Control-R
*d. Control-P

14. What happens if you type "?" in a Cisco router user interface?
a. You see all users logged into the router
b. You list the last command you typed
*c. You enter the help system
d. You find out which mode you are currently in

15. What does it mean if you see a caret symbol (^) on a Cisco router user interface?
*a. Indicates location of an error in a command string
b. Indicates that you are in help mode
c. Indicates that more information must be entered to complete the command
d. Indicates that you are in privileged mode

16. What would you type at the router user prompt if you wanted to see what show subcommands are available?
a. ?
b. Command ?
*c. Show ?
d. List ?

17. What would you type at the router user prompt if you wanted to see what configuration subcommands are available?
a. ?
b. Command ?
c. List ?
*d. Config ?

18. Which of the commands listed below is only available at the privileged access mode?
a. Ping
*b. Show
c. Trace
d. PPP

Engineering Journal and Workbook, Vol. 1 - Chapter 22 - Router Components
1. Which of the following describes a location from which a router is configured?
*a. Once installed on the network, a router can be configured from virtual terminals.
b. Upon initial configuration, a router is configured from the virtual terminals.
c. Once installed on the network, a router can be configured via modem from the console terminal.
d. Upon initial configuration, a router is configured via modem using the auxiliary port.

2. Which of the following does not describe external configuration of routers?
a. Upon initial configuration, a router is configured from the console terminal.
*b. The router can be connected via modem using the console port.
c. Once installed, a router is configured from the console terminal.
d. Configuration files can be downloaded from a TFTP server on the network.

3. Which of the following router components has these characteristics: Stores routing tables, fast-switching cache, and packet hold queues?
a. NVRAM

*b. RAM/DRAM
c. Flash
d. ROM

4. Which of the following router components has these characteristics: Holds the operating system and microcode; retains its contents when you power down or restart; and allows software updates without replacing chips?
a. NVRAM
b. RAM/DRAM
*c. Flash
d. ROM

5. Which of the following best describes the function of NVRAM?
a. Provides temporary and/or running memory for the router's configuration file while the router is powered on.
*b. Stores the router's backup configuration file. The content is retained when you power down or restart.
c. Holds the operating system image and microcode and allows you to update software without removing and replacing chips on the processor.
d. Contains power-on diagnostics, a bootstrap program, and operating system software.

6. Which of the following does not describe a function of working storage RAM in a router?
a. A bootstrap program performs tests and then loads the Cisco IOS software into memory.
b. A saved version of the configuration file is accessed from NVRAM and loaded into main memory when the router initializes.
*c. The EXEC part of the IOS software handles packet buffering and the queuing of packets.
d. The operating system image is usually executed from the main RAM and loaded from an input source.

7. Which of the following is the router mode that supports debugging and testing commands, manipulation of configuration files, and detailed examination of the router?
a. Global configuration mode
b. RXBOOT mode
*c. Privileged EXEC mode
d. Setup mode

8. Which of the following describes functions of the User EXEC mode of a router?
a. Presents an interactive prompted dialog that helps the new user create a first-time basic configuration
b. Implements powerful one-line commands that perform simple configuration tasks
c. Used for recovery from catastrophe, such as to recover lost passwords
*d. Allows the user to view some information about the router but not change anything

9. If you are in global configuration mode, what does the router prompt look like?
a. router #
*b. router (config) #
c. router-config #
d. r-config #

10. When you are in user mode, what does the router prompt look like?
a. router -

*b. router >
c. router #
d. router

11. What is the command you enter to gain access to Privileged Exec mode?
*a. ena
b. p exec
c. exec
d. enable p-exec

12. Which of the following does not correctly describe the function of a router status command?
a. [show version] - Displays configuration of the system hardware, the names and sources of configuration files, and the boot images.
b. [show mem] - Displays statistics about the router's memory, including memory free pool statistics.
*c. [show buffers] - Displays statistics for the buffer pools on the router.
d. [show interfaces] - Displays statistics for all interfaces configured on the router.

13. If you type show ? at the router > prompt, what will show up on the screen?
a. Nothing, this is not a valid command.
*b. All the items that can be shown in user mode.
c. The status of the router.
d. Information about the version of the IOS that is currently running.

14. Which of the following describes a function of the [show running-config] Cisco IOS command?
a. It allows an administrator to see the image size and startup configuration commands the router will use on the next restart.
b. It displays a message at the top showing how much nonvolatile memory has been used.
c. It allows an administrator to see the configuration of the processes and interrupt routines.
*d. It allows an administrator to see the current running configuration on the router.

15. Which of the following describes a function of the [show startup-config] Cisco IOS command?
a. It allows an administrator to see the current running configuration on the router.
*b. It displays a message at the top showing how much nonvolatile memory has been used.
c. It allows an administrator to see the reason for the last system reboot.
d. It displays this message at the top: "Current Configuration".

16. The [show interface serial] Cisco IOS router command can display which one of the following lines of information?
a. IOS (tm) 4500 Software (C4500-J-M), Experimental Version 11.2
b. DECNET routing is enabled
*c. Serial 1 is up, line protocol is up
d. System image file is "c4500-j-mz"

17. The [show version] Cisco IOS router command can display which one of the following lines of information?
*a. IOS (tm) 4500 Software (C4500-J-M), Experimental Version 11.2
b. Hardware is MK5025

c. Internet Protocol routing is enabled
d. Internet address is 183.8.64.129

18. The [show protocols] Cisco IOS router command can display which one of the following lines of information?
a. Serial 1 is up, line protocol is up
b. Compiled Fri 28-Jun-96
*c. Apple Talk routing is enabled
d. ROM; System Bootstrap, Version 5.1(1)

19. What kind of information cannot be obtained when you enter [show interface] in the user mode?
a. The MAC address for all interfaces
b. The IP address for all interfaces
*c. How many users are logged onto each interface
d. The encapsulation protocol for each interface

20. If you typed [show interface E0] at the prompt router#, which of the following best shows what the first five lines of the response would look like if the interface was up?
a. Ethernet0 is up, line protocol is up''Address is 0000.0f92,c54b (bia 0000.0f92.c54b)''Internet address is 223.8.151.1/24''MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255''Encapsulation ARPA, loopback not set, keepalive set (10sec)
b. Ethernet0 is up, line protocol is up''Hardware is Lance, address is 0000.0f92.c54b (bia 0000.0f92.c54b)''Internet address is 223.S.151.1/24''ARP type: ARPA, ARP Timeout 05:00:00''Encapsulation ARPA, loopback not set, keepalive set (10sec)
*c. Ethernet0 is up, line protocol is up''Hardware is Lance, address is 0000.0f92.c54b (bia 0000.0f92.c54b)''Internet address is 223.8.151.1/24''MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec, rely 255/255, load 1/255''Encapsulation ARPA, loopback not set, keepalive set (10sec)
d. Ethernet0 is up, line protocol is up''Address is 0000.0f92.c54b (bia 0000.0f92.c54b)''Internet address is 223.8.151.1/24''Subnet Mask is 255.255.255.255/24''Encapsulation ARPA, loopback not set, keepalive set (10sec)

21. Which one of the following is a function of Cisco Discovery Protocol (CDP)?
a. Provides a way to use an echo to evaluate the path-to-host reliability
b. Provides a way to determine whether a routing table entry exists
c. Provides a way to see the current running configuration on the local router
*d. Provides a way to access summaries of configurations on directly connected devices

22. Which of the following is a characteristic of Cisco Discovery Protocol (CDP)?
a. It runs over OSI Layer 3.
*b. It allows CDP devices that support different network-layer protocols to learn about each other.
c. It will obtain information about neighboring devices only if the administrator enters commands.
d. It obtains information only about devices running TCP/IP.

23. What steps does the network administrator have to take to make Cisco Discovery Protocol (CDP) run at system start up?
a. Type "cdp enable" at the first router prompt.
b. Type "cdp enable" at the first privilege EXEC router prompt.

*c. CDP runs automatically at start up.
d. Type "cdp enable" at any prompt at then save the config file.

24. Which of the following is a function of the CDP [show] command?
a. It displays information about any CDP-enabled router on the network.
b. It displays information on a console connected to any node in the network.
c. It helps evaluate delays over network paths and path-to-host reliability.
*d. It identifies neighboring routers' host names and IP addresses.

25. Which of the following is not provided by the CDP [show] command to tell about neighbor routers?
*a. Processes list, with information about the active processes
b. Port identifier, such as Ethernet0, Serial1, etc.
c. The device's hardware platform
d. Address list, with addresses for supported protocols

26. Which of the following is a function of the [cdp enable] command?
a. Boots up the Cisco IOS software and implements diagnostic testing
b. Displays values of the CDP timers
*c. Begins CDP's dynamic discovery function on the router's interfaces
d. Discards expired holdtime values

27. Which of the following is not a function of the [show cdp interface] command?
a. Displays the values of the CDP timers
*b. Displays the reasons for system reboot
c. Displays the interface status
d. Displays the encapsulation used by CDP

28. Which of the following is a function of the [show cdp entry] (device name) command?
a. Establishes a connection to a remote router
b. Displays the cached CDP entry for every directly connected CDP router
*c. Allows an administrator to see the IP addresses of the targeted router
d. Displays version information about the network protocols running on the router

29. Which of the following is not a function of the [show cdp entry] (device name) command?
*a. Displays the cached CDP entry for every directly connected CDP router
b. Displays all Layer 3 addresses present on the router
c. Displays how long ago the CDP frame arrived from the router
d. Displays version information about the router

30. Which of the following is a function of the [show cdp neighbors] command?
a. Displays the device capability code of remote routers
b. Displays the path-to-host reliability of a network connection
c. Displays the encapsulation of the protocols used by neighbor routers
*d. Displays the neighbor's remote port type and number

31. Which of the following is not a function of the [show cdp neighbors] command?
a. Displays the cached CDP entry for every directly connected CDP router
*b. Displays the CDP updates received on any network router
c. Displays information like that from [show cdp entry] when [show cdp neighbors detail] is used

d. Displays neighbor device IDs

32. Why would you use the [show cdp neighbors] command?
a. To get a snapshot view of the routers in the network
*b. To get a overview of the routers that are directly connected to me
c. To get the IP addresses for neighboring routers
d. To building a routing table for all routers in the network neighborhood

33. Which of the following is a feature of Telnet router operations?
a. Telnet is typically used to connect a router to neighbor routers.
b. A router can have only one incoming Telnet session at a time.
*c. A Telnet session can be suspended and then resumed.
d. To initiate a Telnet session, you have to know the name of the host.

Engineering Journal and Workbook, Vol. 1 - Chapter 23 - Router Startup and Setup
1. Which of the following is the correct order of steps in the Cisco router system startup routine?
a. (1) locate and load operating system, (2) load bootstrap, (3) test hardware, (4) locate and load configuration file
*b. (1) test hardware, (2) load bootstrap, (3) locate and load operating system, (4) locate and load configuration file
c. (1) load bootstrap, (2) locate and load configuration file, (3) test hardware, (4) locate and load operating system
d. (1) test hardware, (2) load bootstrap, (3) locate and load configuration file, (4) locate and load operating system

2. Which of the following is not a step in the Cisco router system startup routine?
a. Load bootstrap
b. Power-up hardware self-test
*c. Enable CDP on each interface
d. Locate and load configuration file

3. Which of the following is an important function of the power-up self-test?
a. To determine the router hardware and software components and list them on the console terminal
b. To cause other instructions to be loaded into memory
*c. To execute diagnostics that verify the basic operation of router hardware
d. To start routing processes, supply addresses for interfaces, and set up media characteristics

4. Which of the following is an important result of Cisco IOS loading onto a router?
*a. Determining the router hardware and software components, and listing them on the console terminal
b. Causing other instructions to be loaded into memory
c. Executing diagnostics that verify the basic operation of router hardware
d. Starting routing processes, supplying addresses for interfaces, and setting up media characteristics

5. Which of the following is an important result of the configuration file loading onto a router?
a. Determining the router hardware and software components and listing them on the console terminal
b. Causing other instructions to be loaded into memory

c. Executing diagnostics that verify the basic operation of router hardware
*d. Starting routing processes, supplying addresses for interfaces, and setting up media characteristics

6. Which of the following is not a function of the router system startup routine?
*a. Verifying the routing of protocol packets
b. Testing of the basic operations of router hardware
c. Causing other instructions to be loaded into memory
d. Starting routing processes, supplying addresses for interfaces, and setting up media characteristics

7. What is the function of the [erase startup-config] command?
*a. It deletes the backup configuration file in NVRAM.
b. It deletes the bootstrap image from Flash memory.
c. It deletes the current IOS from NVRAM.
d. It deletes the current running configuration from Flash memory.

8. What is the function of the [reload] command?
a. It loads a backup configuration file from a TFTP server.
b. It saves the new IOS to Flash memory.
*c. It reboots the router.
d. It loads the new configuration file in NVRAM.

9. Which router command deletes the backup configuration file in NVRAM?
a. [delete backup-config]
b. [erase backup-config]
c. [delete startup-config]
*d. [erase startup-config]

10. Which router command causes the router to reboot?
*a. [reload]
b. [restart]
c. [reboot]
d. [rerun]

11. When is the router setup mode executed?
a. After the saved configuration file is loaded into main memory
b. When the network administrator needs to enter complex protocol features on the router
c. When the router begins software initialization
*d. When the router cannot find a valid configuration file

12. Which of the following does not describe features of the router setup mode?
a. Many default settings appear in square brackets.
b. The prompt and command for the setup mode are "router# setup".
c. The first line and title of the setup dialog is "System Configuration Dialog".
*d. Pressing the Return key cancels dialog prompts.

13. Which of the following correctly describes a procedure for setup of router global and interface parameters on a router?
a. A default parameter is shown in square brackets at every prompt.
*b. The router host name must be set.
c. An enable secret password can be set, but is not required.
d. For each installed interface, a series of questions must be answered.

14. Which of the following does not correctly describe a procedure for setup of global and interface parameters on a router?

a. An enable secret password must be entered.
*b. A default parameter is shown in square brackets at every prompt.
c. Configuration values that you have determined for the installed interfaces are entered as parameters at the interface prompts.
d. The router host name must be set.

15. What information do you need to gather before starting a global or interface configuration session on a router?
a. Brand and model of router and type of networks the router connects to directly.
b. IOS version and current register setting.
*c. Which routing protocols will be needed, IP addresses of interface and subnets, and which interfaces are being used.
d. IP addresses of neighboring routers, size of Flash memory.

16. Which of the following correctly describes the router setup script review?
*a. The setup command program displays the configuration that was created from your answers to the setup prompts.
b. The setup command program asks you if you want to change any of your answers.
c. If you choose to use the displayed configuration, you select a location to save it to.
d. If you choose not to use the configuration, you must reboot the router.

17. Which of the following correctly describes the procedure for modifying the script displayed upon completion of the router configuration process?
a. The setup command program prompts you at each of the script lines as to whether you want to change your answers.
b. You choose not to accept the configuration and the router then reboots.
c. You select the dialog lines that you want to change and the program then prompts you again at those lines.
*d. The script tells you to use configuration mode to modify the configuration.

18. Why might you want to issue [show startup-config] and [show running-config] commands?
a. It's time to update the IOS and you need to kill certain router processes before proceeding.
b. To determine the time since the router booted and the current register setting.
*c. The router suddenly isn't working right and you want to compare the initial state to the present state.
d. To find out where the IOS booted from and which version is being used.

19. Why should the enable password be different than the enable secret password?
a. The router asks that the passwords be changed monthly if they are the same
b. To provide an additional category of users
*c. The enable password can be read directly from the configuration file
d. The IOS behaves badly if they are the same

20. What file(s) would you find in NVRAM?
a. IOS and configuration files
*b. Configuration file
c. Backup copy of IOS

d. Limited version IOS and registry files

Engineering Journal and Workbook, Vol. 1 - Chapter 24 - Router Configuration

1. Which of the following is not a function of the privileged EXEC [configure] command?
a. To configure a router from a virtual terminal
*b. To configure a TFTP server from a virtual terminal
c. To configure a router from the console terminal
d. To load a configuration from a network TFTP server

2. Which of the following is not a step in using the [copy running-config tftp] command to store the current router configuration? (The steps are listed in order.)
a. Enter the [copy running-config tftp] command.
*b. Enter the IP address of the router.
c. Enter the name you want to assign to the configuration file.
d. Confirm your choices.

3. Which of the following is not a step in using the [copy tftp running-config] command to load a router configuration file stored on a TFTP server? (The steps are listed in order.)
a. Enter the [copy tftp running-config] command.
b. Select either a host configuration file or a network configuration file.
c. Enter the IP address of the remote host from which you retrieve the configuration file.
*d. Enter the name of the server to which you will load the file.

4. Which of the following does not correctly describe using a TFTP server to maintain router configuration files?
*a. A host configuration file contains commands that apply to all routers and terminal servers on the network.
b. The convention for all filenames is UNIX-based.
c. The default filename is [hostname-config] for the host file.
d. Reconfiguration of the router occurs as soon as a new file is downloaded to the router.

5. You want to replace your current configuration file with one located on a TFTP server, what is the process you need to go through to do this?
a. router (config)# copy tftp running-config''Host or network configuration file [host]?''IP address of remote host [255.255.255.255]? 131.108.6.155''Name of configuration file [Router-config]? paris.3''Configure using paris.3 from 131.108.6.155 [confirm] y''Booting paris.3 from 131.108.6.155: !! [OK - 874/16000 bytes]''Router (config)0
b. router # copy tftp running-config''Host or network configuration file [host]?''IP address of remote host [255.255.255.255]? 131.108.6.155''Configure using paris.3 from 131.108.6.155 [confirm] y''Booting paris.3 from 131.108.6.155: !! [OK - 874/16000 bytes]''Router#
c. router # copy tftp running-config''Host or network configuration file [host]?''Name of configuration file [Router-config]? paris.3''Configure using paris.3 from 131.108.6.155 [confirm] y''Booting paris.3 from 131.108.6.155: !! [OK - 874/16000 bytes]''Router#
*d. router 0 copy tftp running-config''Host or network configuration file [host]?''IP address of remote host [255.255.255.255]? 131.108.6.155''Name of configuration file [Router-config]? paris.3''Configure using paris.3 from 131.108.6.155 [confirm] y''Booting paris.3 from 131.108.6.155: !! [OK - 874/16000 bytes]''Router#

6. What is the function of the [configure memory] router command?
*a. Loads configuration information from NVRAM
b. Erases the contents of NVRAM
c. Stores into NVRAM the current configuration in RAM
d. Displays the configuration saved in NVRAM

7. What is the function of the [copy running-config startup-config] router command?
a. Loads configuration information from NVRAM
b. Erases the contents of NVRAM
*c. Stores into NVRAM the current configuration in RAM
d. Displays the configuration saved in NVRAM

8. You have added a new LAN onto you network, therefore, you have updated your routing table and other parts of your configuration file. What command do you need to issue to save the new configuration file?
a. [copy config startup-config]
*b. [copy running-config startup-config]
c. [configure memory]
d. [copy startup-config config-running]

9. Which router mode is a subset of the EXEC commands available at the privileged EXEC mode?
*a. Global configuration mode
b. User EXEC mode
c. Interface configuration mode
d. Router configuration mode

10. What is the system prompt for the user EXEC router mode?
*a. Router>
b. Router#
c. Router(config)#
d. User EXEC

11. What happens when you type exit at a router mode prompt?
a. A configuration mode prompt appears.
b. The router logs you off.
*c. The router backs out one mode level.
d. A question prompt appears, requesting a network device location.

12. What does the router prompt look like when you are in global configuration mode?
a. router#
b. router (config-router)#
*c. router (config)#
d. router-config#

13. If you want to back completely out of config mode, what must you enter?
a. exit
b. no config-mode
c. control e
*d. control z

14. If you type control-z to get out of config mode, where do you end up?
a. user EXEC mode
*b. privileged EXEC mode
c. global-config mode
d. router-mode

15. If you are planning to configure an interface, what prompt should be on the router?
a. router (config)#
b. router (config-in)#
c. router (config-intf)#
*d. router (Config-if)#

16. Which of the following does not describe a procedure for using the router global configuration mode?
a. You type "configure" to enter global configuration mode.
b. You can specify the terminal, NVRAM, or a file on a server as the source of configuration commands.
*c. You can type commands to configure specific interfaces.
d. You can type a command to reach a prompt for the interface configuration mode.

17. Which of the following is the system prompt for the global configuration mode?
a. Router#
*b. Router(config)#
c. Router(config-global)#
d. Router(config-router)#

18. Which of the following does not describe a step in the procedure for using the router configuration mode?
a. Enter a global router protocol command type at the global configuration prompt.
b. The Router(config-router)# prompt indicates you are in router configuration mode.
*c. Defaults can be selected for all available command options.
d. Finish using this mode with the command "exit".

19. Which of the following does not describe a step in the procedure for using the interface configuration mode?
a. Enter a global interface type and number command at the global configuration prompt.
b. The Router(config-if)# prompt indicates you are in interface configuration mode.
c. Interfaces can be turned on and off using commands in this mode.
*d. Interface types are enabled at subcommands in this mode.

20. Which of the following is a correct order for the process of configuring a router? (Assume you have already made router changes in configuration mode.)
a. (1) Save changes to backup, (2) decide if changes are your intended results, (3) examine results, (4) examine backup file
*b. (1) Examine results, (2) decide if changes are your intended results, (3) save changes to backup, (4) examine backup file
c. (1) Decide if changes are your intended results, (2) examine backup file, (3) save changes to backup, (4) examine results
d. (1) Examine results, (2) save changes to backup, (3) decide if changes are your intended results, (4) examine backup file

21. Which of the following best describes the process of configuring a router?
a. (1) Examine results, (2) make changes in configuration mode, (3) remove changes, (4) decide if changes are your intended results
b. (1) Decide if changes are your intended results, (2) make changes in configuration mode, (3) examine results, (4) remove changes
c. (1) Make changes in configuration mode, (2) decide if changes are your intended results, (3) examine results, (4) remove changes

*d. (1) Make changes in configuration mode, (2) examine results, (3) decide if changes are your intended results, (4) remove changes

22. Which of the following is a command that can be used to save router configuration changes to a backup?
*a. Router# copy running-config tftp
b. Router# show running-config
c. Router# config mem
d. Router# copy tftp running-config

23. Which of the following is not a command to remove router configuration changes?
a. Router(config)# no ...
b. Router# config mem
*c. Router# copy running-config startup-config
d. Router# copy tftp running-config

24. Which of the following correctly describes password configuration on routers?
a. All passwords are established in the privileged EXEC mode.
b. All passwords alter the password character string.
*c. A password can be established on all incoming Telnet sessions.
d. The enable password command restricts access to user EXEC mode.

25. Which of the following does not describe password configuration on routers?
*a. Passwords can be established in every configuration mode.
b. A password can be established on any console terminal.
c. The enable-secret password uses an encryption process to alter the password character string.
d. All password establishment begins in the global configuration mode.

26. When you are setting passwords for vty 0 4, what access point to the router are you setting a password for?
a. Line consoles
*b. Telnet sessions
c. Remote host router
d. Virtual hosts

27. The password set up with the [enable-secret] command is to control direct access to what?
a. User EXEC mode
b. Configure Interface mode
*c. Privilege EXEC mode
d. Global Config mode

28. Which of the following correctly describes procedures for confirming router identification?
a. Routers should be named only after initial testing of the network.
b. If no name is configured, the system automatically assigns the router a number.
*c. You name the router in global configuration mode.
d. The login banner can be configured to display system error messages.

29. Which of the following does not describe procedures for confirming router identification?
a. If no name is configured, the system default router name is "Router".
b. Naming your router to be the host should be one of the first network configuration tasks.
c. The login banner is configured in global configuration mode.

*d. You can configure a message-of-the-day banner to display on specified terminals.

30. You want to create a message to let people know a little something about the network when they log on - what command enables you to do this?
a. [banner mesg]
*b. [banner motd]
c. [daily mesg]
d. [daily motd]

Engineering Journal and Workbook, Vol. 1 - Chapter 25 - IOS
1. Which of the following correctly describes a method for specifying how a router loads the Cisco IOS software?
*a. Designate fallback sources for the router to use in sequence from NVRAM
b. Configure the Cisco IOS software image for the location where it will bootstrap
c. Manually boot a default system image at a virtual terminal
d. Manually boot a default system image at the network server

2. Which is the sequence used by the router for automatic fallback to locate Cisco IOS software?
a. (1) Flash, (2) NVRAM, (3) TFTP server
b. (1) NVRAM, (2) TFTP server, (3) Flash
*c. (1) NVRAM, (2) Flash (3), TFTP server
d. (1) TFTP server, (2) Flash (3), NVRAM

3. Which of the following does not describe configuration register settings for Cisco IOS bootstrapping?
a. The order in which the router looks for system bootstrap information depends on the boot field setting.
b. You change the configuration register setting with the command [config-register].
c. You use a hexadecimal number when setting the configuration register boot field.
*d. Use the [show running-config] command to check the boot field setting.

4. Which of the following is information displayed by the Cisco IOS [show version] command?
a. Statistics about the router's memory
*b. Name of the system image
c. Information about the Flash memory device
d. Status of configured network protocols

5. Which command is used to discover the configuration register setting?
a. [show register]
b. [show running-config]
*c. [show version]
d. [show startup-config]

6. Which of the following does not correctly describe a fallback option for booting Cisco IOS software?
a. Flash memory provides storage that is not vulnerable to network failures.
b. Loading Cisco IOS software from a TFTP server is a good option in case Flash memory becomes corrupted.
*c. The system image booted from ROM is usually a complete copy of Cisco IOS software.

d. ROM may contain an older version of Cisco IOS software.

7. Which of the following correctly describes preparing to use a TFTP server to copy software to Flash memory?
*a. The TFTP server must be another router or a host system such as a UNIX workstation or a laptop computer.
b. The TFTP host must be a system connected to an Ethernet network.
c. The name of the router containing the Flash memory must be identified.
d. The Flash memory must be enabled.

8. Which of the following is not a step in preparing to copy software from a TFTP host to Flash memory?
a. Check on the router to make sure you can see and write into Flash.
b. Verify that the router has sufficient room to accommodate Cisco IOS software.
*c. Use the [show ip route] command to make sure you can access the TFTP server over the TCP/IP network.
d. Check on the TFTP server to make sure you know the file or file space for the Cisco IOS software image.

9. Which of the following does not describe the procedure to verify sufficient room in Flash memory for copying software?
a. Use the [show flash] command.
*b. Identify the total memory in Flash, which is the available memory.
c. Compare the available memory with the length of the Cisco IOS software image to be copied.
d. If there is not enough available memory, you can try to obtain a smaller Cisco IOS software image.

10. How would you determine the size of the IOS image file on a TFTP server?
a. Go to the Cisco Web site and consult the image file size table.
b. Type [show version] on your router.
*c. Do [dir] or [ls] on the TFTP server.
d. Telnet to the TFTP server and issue a [show files] command.

11. Which of the following is the fastest way to make sure the TFTP server is reachable prior to trying to transfer an IOS image file?
a. Trace the TFTP server
*b. Ping the TFTP server
c. Telnet to the TFTP server
d. Call the TFTP server administrator

12. Why do you need to determine the file size of the IOS image on the TFTP server before transferring it to your router?
*a. To check that there is enough space in Flash to store the file
b. To verify that the file is the correct IOS for your router
c. To complete a trivial file transfer protocol operation, the file size must be known
d. To calculate the download time for the file and thus, the amount of time the router will be out of service

13. What information is not provided in the Cisco image filename system?
a. Capabilities of the image
b. The platform on which the image runs
c. Where the image runs
*d. Size of the image

14. Which of the following is not part of the procedure for creating a Cisco IOS software image backup to a TFTP server?

a. Use the [show flash] command to learn the name of the system image file.
b. Enter the [copy flash tftp] command to begin the copy process.
*c. Enter the IP address of the router holding the image file.
d. You may rename the file during transfer.

15. Why does an administrator create a Cisco IOS software image backup?
a. To verify that the copy in Flash is the same as the copy in ROM
b. To provide a fallback copy of the current image prior to copying the image to a new router
c. To create a fallback copy of the current image as part of procedures during recovery from system failure
*d. To create a fallback copy of the current image prior to updating with a new version

16. Which of the following is not part of the procedure for loading a new Cisco IOS software image to Flash memory from a TFTP server? (The procedures are listed in correct order.)
a. Backup a copy of the current software image to the TFTP server.
*b. Enter the [copy flash tftp] command to start downloading the new image from the server.
c. The procedure asks if you are willing to erase Flash.
d. A series of Vs on the display indicates successful check run verification.

17. Which of the following is not part of the procedure for loading a backup Cisco IOS software image to Flash memory from a TFTP server? (The procedures are listed in correct order.)
a. Enter the [copy tftp flash] command.
b. A prompt asks you for the IP address of the TFTP server.
*c. If a file with the same name exists in Flash memory, the file being copied automatically replaces it.
d. Enter the [reload] command to boot up the router using the newly copied image.

18. What is the initial boot attempt if the router register is set to Ox2100?
*a. ROM Monitor
b. TFTP server
c. ROM
d. Flash

19. What is the initial boot attempt if the router register is set to Ox2101?
a. ROM Monitor
b. TFTP server
*c. ROM
d. Flash

20. What is the initial boot attempt if the router register is set to Ox2102?
a. ROM Monitor
b. TFTP server
c. ROM
*d. Flash

Engineering Journal and Workbook, Vol. 1 - Chapter 26 - TCP/IP
1. Which of the following best describes TCP/IP?
*a. Suite of protocols that can be used to communicate across any set of interconnected networks

b. Suite of protocols that allows LANs to connect into WANs
c. Protocols that allow for data transmission across a multitude of networks
d. Protocols that allow different devices to be shared by interconnected networks

2. Which of the following best describes the purpose of TCP/IP protocol stacks?
a. Maps closely to the OSI reference model in the upper layers
*b. Supports all standard physical and data-link protocols
c. Transfers information in a sequence of datagrams
d. Reassembles datagrams into complete messages at the receiving location

3. The function of the application layer of the TCP/IP conceptual layers is best described by which of the following?
a. Responsible for breaking messages into segments and then reassembling them at the destination
b. Acts as a protocol to manage networking applications
*c. Exists for file transfer, e-mail, remote login, and network management
d. Resends anything that is not received, and reassembles messages from the segments

4. Why are TCP three-way handshake/open connections used?
a. To ensure that lost data can be recovered if problems occur later
*b. To determine how much data the receiving station can accept at one time
c. To provide more efficient use of bandwidth by users
d. To change binary ping responses into information in the upper layers

5. What does a TCP sliding window do?
a. It makes the window larger so more data can come through at once, which results in more efficient use of bandwidth.
b. The window size slides to each section of the datagram to receive data, which results in more efficient use of bandwidth.
*c. It allows the window size to be negotiated dynamically during the TCP session, which results in more efficient use of bandwidth.
d. It limits the incoming data so that each segment must be sent one by one, which is an inefficient use of bandwidth.

6. What do the TCP sequence and acknowledgement numbers do?
a. They break datagrams into their binary coefficients, number them sequentially, and send them to their destination, where their receipt is acknowledged by the sender.
b. They break messages down into datagrams that are numbered and then sent to a host according to the sequence set by the source TCP.
c. They provide a system for sequencing datagrams at the source and acknowledging them at the destination.
*d. They provide sequencing of segments with a forward reference acknowledgement, number datagrams before transmission, and reassemble the segments into a complete message.

7. Why does UDP use application layer protocols to provide reliability?
a. To speed the transmission over the network.
b. The lack of reliability protocols makes the software less expensive and easier to configure.
c. It lacks a protocol to sequence datagrams and negotiate window size.
*d. It does not use windowing or acknowledgements.

8. What does the acronym ICMP stand for?

a. Internetwork Connection Model Protocol
b. Internet Connection Monitor Protocol
*c. Internet Control Message Protocol
d. Internetwork Control Mode Protocol

9. What is the purpose of ICMPs?
a. The put the internetwork in control mode so that the protocols can be set up.
b. They are messages that the network uses to monitor connection protocols.
c. They are standard binary messages that act as model internetwork protocols.
*d. They are messages carried in IP datagrams used to send error and control messages.

10. What does the acronym ARP stand for?
a. Address Resource Protocol
*b. Address Resolution Protocol
c. Address Research Program
d. Address Routing Program

11. What is the function of ARP?
a. It completes research for a destination address for a datagram.
b. It is used to develop a cached address resource table.
*c. It is used to map an IP address to a MAC address.
d. It sends a broadcast message looking for the router address.

12. How does a sender find out the destination's MAC address?
a. It consults its routing table.
b. It sends a message to all the addresses searching for the address.
*c. It sends out a broadcast message to the entire LAN.
d. It sends out a broadcast message to the entire network.

13. What is the function of the RARP?
*a. It is a protocol in the TCP/IP stack that provides a method for finding IP addresses based on MAC addresses.
b. It is a protocol used to map a 32-bit IP address to a MAC address.
c. It is a protocol used to develop a cached address resource table for the router.
d. It a protocol that completes research for a destination address for a datagram based on the IP address.

14. Which of the following best describes the purpose of checksum?
a. Method for comparing IP addresses against those permitted access to allow entry by a host
*b. Method for checking the integrity of transmitted data.
c. Method for computing a sequence of octets taken through a series of arithmetic operations.
d. Method for recomputing IP address values at the receiving end and comparing them for verification.

15. Which of the following best describes flow control?
a. A device at the destination side that controls the flow of incoming data
b. A buffer at the source side that monitors the outflow of data
*c. A technique that ensures that the source does not overwhelm the destination with data
d. A suspension of transmission until the data in the source buffers has been processed

16. What does the acronym SNMP stand for?

a. Standard Node Monitor Protocol
b. Standard Network Management Protocol
c. Simple Node Management Protocol
*d. Simple Network Management Protocol

17. What is the purpose of SNMP?
*a. Means to monitor and control network devices and to manage configurations, statistics collection, performance, and security
b. Means to monitor the devices that are connected to one router, and assign a regular address to each host on the node network
c. Protocol that provides the network administrator with the ability to manage the devices on the network and control who has access to each node
d. Protocol that allows for the management of network security, performance, and configuration from a remote host

18. Which of the following best describes TTL?
a. Field in the datagram header that determines how long the data is valid
*b. Field in an IP header that indicates how long a packet is considered valid
c. Field within an IP datagram that indicates the upper-layer protocol sending the datagram
d. Field in a datagram head that indicates when the next data packet will arrive

19. Which of the following best describes UDP?
a. A protocol that acknowledges flawed or intact datagrams
b. A protocol that detects errors and requests retransmissions from the source
c. A protocol that processes datagrams and requests retransmissions when necessary
*d. A protocol that exchanges datagrams without acknowledgments or guaranteed delivery

20. Which of the following best describes window size?
a. The maximum size of the window that a software can have and still process data rapidly
*b. The number of messages that can be transmitted while awaiting an acknowledgment
c. The size of the window, in picas, that must be set ahead of time so data can be sent
d. The size of the window opening on a monitor, which is not always equal to the monitor size

Engineering Journal and Workbook, Vol. 1 - Chapter 27 - IP Addressing
1. How does a router gain access to IP addresses?
a. All host addresses must be entered individually by the network administrator.
*b. The router learns addresses from other routers.
c. The network administrator creates a routing table of all addresses.
d. All hosts automatically send their address to any available router.

2. What kind of address can a device or interface have?
a. Any kind
b. A network number and then all ones
*c. A nonzero network number
d. A nonzero host number

3. If a router has an Ethernet interface E0, with IP address 172.31.4.1, and if the interface uses a mask of 255.255.255.0, what is the subnet number?
a. E0: 172.16.1.0
*b. E0: 172.31.4.0
c. E0: 172.31.16.0
d. E0: 172.31.41.0

4. If you wanted to assign an address and a subnet mask and start IP processing on an interface, what command would you use?
*a. IP address subnet mask
b. IP address
c. Subnet mask
d. Address IP process

5. If you want to connect a name to an IP address, such as "asu 129.219.0.0," what command structure would you use?
*a. IP host asu 129.219.0.0
b. IP name asu 129.219.0.0
c. IP host name asu 129.219,0.0
d. IP host address asu 129.219.0.0

6. What is the purpose of "tcp-port-number" in the ip host commands?
a. It identifies which IP address to use when using the host name with an EXEC connect or Telnet command.
b. It sets the default port of any device to port23.
c. It sets the port of the source device in the router table.
*d. It identifies which TCP port to use when using the host name with an EXEC connect or Telnet command.

7. What is the purpose of the [ip name-server] command?
*a. It defines which hosts can provide the name service.
b. It defines a naming scheme that allows a device to be identified by its location.
c. It identifies which TCP port to use when using the host name.
d. It generates messages from each router used along a datagram's path.

8. Which of the following best describes the function of the [show hosts] command?
a. It identifies the subnet mask being used at the destination site.
b. It maintains a cache of host name-to-address mappings for use by EXEC commands.
*c. It is used to display a cached list of host names and addresses.
d. It shows the host name for the IP address.

9. When you use the [ping] command and get a result of "!," what does it mean?
*a. Successful receipt of an echo reply
b. Times out waiting for datagram reply
c. Destination unreachable error
d. Congestion-experienced packet

10. What does it mean when you use the [ping] command and get a result of "."?
a. Successful receipt of an echo reply
*b. Timed out waiting for datagram reply
c. Destination unreachable error
d. Congestion-experienced packet

11. When you use the [ping] command and get a result of "U," what does it mean?

a. Timed out waiting for datagram reply
*b. Destination unreachable error
c. Congestion-experienced packet
d. Ping interrupted

12. When you use the [ping] command and get a result of "C," what does it mean?
a. Packet Time To Live exceeded
b. Ping interrupted
c. Destination unreachable error
*d. Congestion-experienced packet

13. When you use the [ping] command and get a result of "I," what does it mean?
a. Destination unreachable error
*b. Ping interrupted
c. Congestion-experienced packet
d. Packet type unknown

14. When you use the [ping] command and get a result of "?," what does it mean?
a. Packet Time To Live exceeded
b. Ping interrupted
*c. Packet type unknown
d. Congestion-experienced packet

15. When you use the [ping] command and get a result of "&," what does it mean?
a. Congestion-experienced packet
b. Ping interrupted
c. Packet type unknown
*d. Packet Time To Live exceeded

16. Which of the following best describes the function of the extended command mode of the [ping] command?
*a. Used to specify the supported Internet header options
b. Used to specify the time frame for the ping return
c. Used to diagnose why aping was delayed or not returned
d. Used to trace the datagram as it passes through each router

17. How do you enter the extended mode of the [ping] command?
a. ping x
b. ping e
*c. ping [return key]
d. ping m

18. What does the response "!H" mean, when it comes in response to the [trace] command?
*a. The probe was received by the router, but not forwarded.
b. The protocol was unreachable and the trace terminated.
c. The network was unreachable, but the last router was up.
d. The port was reached, but the wire to the network was malfunctioning.

19. When it comes in response to the [trace] command, what does the response "P" mean?
a. Time out.
b. The port was unreachable.
*c. The protocol was unreachable.
d. The network was unreachable.

20. What does the response "N" mean, when it comes in response to the [trace] command?
a. The name has no IP address connected to it.
b. The probe was not received, so it could not be forwarded.
c. The protocol was unreachable.
*d. The network was unreachable.

21. When it comes in response to the [trace] command, what does the response "U" mean?
a. The address was unreachable.
b. The protocol was unreachable.
c. The network was unreachable.
*d. The port was unreachable.

22. What does the response "*" mean when it comes in response to the [trace] command?
a. The destination device refused the trace.
*b. The trace timed out.
c. The network refused the trace.
d. The source used a trace that was not supported by the network protocol.

Engineering Journal and Workbook, Vol. 1 - Chapter 28 - Routing Protocols
1. If you start the router and it cannot find Cisco IOS system image, what will happen?
a. The router will not operate.
b. The router will request that you make the Cisco IOS available.
*c. You will have to manually set up the router in the setup mode.
d. The router will ask you to install any router operating system.

2. What command do you use to access the setup mode?
a. Define
b. Exec
c. Setup
*d. Configure

3. If you manually set up the router, what type of configuration will it have?
a. It will be fully configured.
*b. It will be minimally configured.
c. You will only be able to use it to install Cisco IOS.
d. It will be configured in such a way that no changes can be made, except manually.

4. What kind of entries does a router initially refer to?
a. Entries about networks or subnets that are directly connected
b. Entries it has learned about from the Cisco IOS software
*c. Entries whose IP address and mask information are known
d. Entries it has learned about from other routers

5. Which of the following best describes a static route?
a. Routing table entry that is used to direct frames for which a next hop is not explicitly listed in the routing table
*b. Route that is explicitly configured and entered into the routing table and takes precedence over routes chosen by dynamic routing protocols
c. Route that adjusts automatically to network topology or traffic changes

d. Route that adjusts involuntarily to direct frames within a network topology

6. Which of the following best describes a dynamic routing?
a. Routing that is explicitly configured and entered into the routing table
b. Routing that is used to direct frames for which a next hop is not explicitly listed in the routing table
*c. Routing that adjusts automatically to network topology or traffic changes
d. Routing that adjusts involuntarily to direct frames within a network topology

7. What do link-state algorithms require routers to do?
*a. Flood routing information about the state of its own links to all nodes on the internetwork
b. Flood all its routing information to all nodes on the internetwork
c. Send a complete picture of the topology of the entire network to all nodes on the network
d. Base routing table on information provided by the every other router and send IP information to all nodes on the network

8. An administrative distance of 15 would indicate which of the following?
a. The IP address is static.
b. The IP address is dynamic.
*c. The routing information source is trustworthy.
d. The routing information source is untrustworthy.

9. Why are routing updates not sent to a link if it is only defined by a static route?
a. Because each node in the network already knows the route
*b. To conserve bandwidth
c. To keep routing tables small
d. To keep routing tables organized

10. In the following command, what does the last number stand for?
router (config)# ip route 2.0.0.0 255.0.0.0 1.0.0.2 5
a. The number of hops
b. The number of routes to the destination
*c. The administrative distance
d. The destinations reference number in the routing table

11. Why would you set the administrative distance really high?
a. The network uses Enhanced IGRP.
*b. The dynamic address may be better.
c. The network uses OSPF.
d. The network uses only uses default network addresses.

12. If you just added a new LAN onto your network and you want to add the routes to the new devices to your routing table, what command structure would you use?
a. router (config)> ip route 2.0.0.0 255.0.0.0 1.0.0.2 5
*b. router (config)# ip route 2.0.0.0 255.0.0.0 1.0.0.2 5
c. router (config)# ip route 2.0.0.0 1.0.0.2 5
d. router (config)# ip route 2.0.0.0 255.0.0.0 1.0.0.2

1. Which of the following is not a reason why the OSI model is a layered network model?
*a. A layered model increases complexity.
b. A layered model standardizes interfaces.
c. A layered model enables specialized development effort.
d. A layered model prevents changes in one area from affecting other areas.

2. Which layer of the OSI model handles error notification, network topology, and flow control?
a. The physical layer
*b. The data link layer
c. The transport layer
d. The network layer

3. Which layer of the OSI model establishes, maintains, and manages sessions between applications?
a. The transport layer
*b. The session layer
c. The presentation layer
d. The application layer

4. Which best describes the function of the presentation layer?
*a. It provides data representation and code formatting.
b. It handles error notification, network topology, and flow control.
c. It provides network services to user applications.
d. It provides electrical, mechanical, procedural, and functional means for activating and maintaining the link between systems.

5. Which layer of the OSI model provides network services to user applications?
a. The transport layer
b. The session layer
c. The presentation layer
*d. The application layer

6. Which of the following correctly describes the five conversion steps of data encapsulation when one computer sends an e-mail message to another computer?
*a. Data, segments, packets, frames, bits
b. Bits, frames, packets, segments, data
c. Packets, segments, data, bits, frames
d. Segments, packets, frames, bits, data

7. An e-mail message is sent from Host A to Host B on a LAN. To send this message, the data must be encapsulated. Which of the following best describes the first step of data encapsulation?
*a. Alphanumeric characters are converted into data.
b. The message is segmented into easily transportable chunks.
c. A network header is added to the message (source and destination addresses).
d. The message is converted into binary format.

8. An e-mail message is sent from Host A to Host B on a LAN. Before you can send this message, the data must be encapsulated. Which of the following best describes what happens after a packet is constructed?
a. The packet is transmitted along the medium.
*b. The packet is put into a frame.
c. The packet is segmented into frames.
d. The packet is converted to binary format.

9. An e-mail message is sent from Host A to Host B on a LAN. Before you can send this message, the data must be encapsulated. Which of the following best describes what happens after the e-mail message's alphanumeric characters are converted into data?
a. The data is converted into binary format.
b. The data has a network header added.
*c. The data is segmented into smaller chunks.
d. The data is put into a frame.

10. Which best describes a datagram?
a. A message sent to the source to confirm receipt of uncorrupted data
b. A binary representation of routing information
c. A data packet less than 100 bytes in size
*d. A network-layer packet

First Year Companion Guide - Chapter 2 - The Physical and Data Link Layers
1. What are all the physical connecting materials in a network called?
a. Application media
b. Educational media
*c. Networking media
d. System media

2. What is one advantage of using Fiber-optic cable in networks?
a. It is inexpensive.
b. It is easy to install.
c. It is an industry standard and is available at any electronics store.
*d. It is capable of higher data rates than either coaxial or twisted-pair cable.

3. Which of the following best defines networking media?
a. The cables and wires through which data passes
*b. The various physical environments through which transmission signals pass
c. The computer systems and wires that make up a network
d. Any hardware or software in a network

4. How is information stored on computers?
a. As decimal numbers
*b. As binary numbers
c. As electrons
d. As words and pictures

5. The data link layer is which layer in the OSI model?
a. Layer 1
*b. Layer 2
c. Layer 3
d. Layer 4

6. Which best describes the data link layer of the OSI model?
a. It transmits data to other network layers.
b. It provides services to application processes.
c. It takes weak signals, cleans them, amplifies them, and sends them on their way across the network.
*d. It provides reliable transit of data across a physical link.

7. A NIC is located at which layer of the OSI model?
*a. The data link layer
b. The physical layer
c. The transmission layer

d. The presentation layer

8. What is another name for a MAC address?
a. Binary address
b. Octadecimal address
*c. Physical address
d. TCP/IP address

9. What does a NIC do?
a. It establishes, manages, and terminates sessions between applications and manages data exchange between presentation layer entities.
*b. It provides network communication capabilities to and from a computer system.
c. It provides services to application processes.
d. It provides mechanisms for the establishment, maintenance, and termination of virtual circuits, transport fault detection, recovery, and information flow control.

10. How does a source device locate the destination for data on a network?
*a. The NIC at the destination identifies its MAC address in a data packet.
b. A data packet stops at the destination.
c. The NIC at the destination sends its MAC address to the source.
d. The source sends a unique data packet to each MAC address on the network.

First Year Companion Guide - Chapter 3 - Networking Devices
1. Why are internetworking devices used?
*a. They allow a greater number of nodes, extend the network distance, and merge separate networks.
b. They increase the speed of data transfer and reduce electromagnetic interference in buildings.
c. They provide redundant pathways and thus prevent signal loss and corruption.
d. They allow the connection of devices within an entire building.

2. Which of the following best describes a node?
a. A device that determines the optimal path along which network traffic should be forwarded
b. A device that establishes, manages, and terminates sessions between applications and manages data exchange between presentation-layer entities
c. A device that synchronizes cooperating applications and establishes agreement on procedures for error recovery and control of data integrity
*d. An endpoint of a network connection or a junction common to two or more lines in a network that serve as control points

3. For which of the following problems can repeaters provide a simple solution?
a. Too many types of incompatible equipment on the network
b. Too much traffic on a network
c. Too slow data transmission rates
*d. Too many nodes and/or not enough cable

4. Which of the following best defines signals?
*a. Electrical impulses representing data
b. Amplification of data
c. Conversion of data
d. Officially specified rules or procedures

5. What is one disadvantage of using a hub?
a. A hub cannot extend the network operating distance.
*b. A hub cannot filter network traffic.
c. A hub cannot send weakened signals over a network.
d. A hub cannot amplify weakened signals.

6. Which best describes collision in networking?
a. The result of two nodes on a network transmitting individually
*b. The result of two nodes on a network transmitting simultaneously
c. The result of two nodes on a network transmitting repeatedly
d. The result of two nodes on a network not transmitting

7. Which best describes a collision domain?
*a. A network area within which data packets that have collided are propagated
b. A network area that is bounded by bridges, routers, or switches
c. A network area where routers and hubs are installed
d. A network area where alters are applied

8. What happens if the bridge determines that the destination address carried by a data packet is from the same network segment as the source?
a. It forwards the data to other segments of the network
*b. It does not forward the data to other segments of the network
c. It passes data packets between two network segments
d. It passes data packets between networks operating under different protocols

9. What does a router do?
*a. It matches information in the routing table with the data's destination IP address and sends incoming data to the correct subnetwork and host.
b. It matches information in the routing table with the data's destination IP address and sends incoming data to the correct subnetwork.
c. It matches information in the routing table with the data's destination IP address and sends incoming data to the correct network.
d. It matches information in the routing table with the data's destination IP address and sends incoming data to the correct subnet.

10. What networking device can solve the problem of excessive broadcast traffic?
a. A bridge
*b. A router
c. A hub
d. A filter

First Year Companion Guide - Chapter 4 - LANs and WANs
1. Which of the following is not a major characteristic of a LAN?
*a. It operates over a wide geographic area
b. It provides multiple users with access to high-bandwidth media
c. It provides full-time connectivity to local services.
d. It connects physically adjacent devices.

2. What is another name for 10Base5 cabling?
*a. Thick Ethernet
b. Telephone wiring
c. Thin Ethernet
d. Coaxial Ethernet

3. What type of cabling medium is used for 10BaseT?
a. Fiber-optic or unshielded twisted-pair cable
b. Fiber-Optic or coaxial cable
*c. Twisted-pair cable
d. Coaxial cable

4. Which of the following is true about a CSMA/CD network?
*a. One node's transmission traverses the entire network and is received and examined by every node.
b. Signals are sent directly to the destination if both the MAC and IP addresses are known by the source.
c. One node's transmission goes to the nearest router, which sends it directly to the destination.
d. Signals are always sent in broadcast mode.

5. Which best describes broadcasting?
*a. Sending a single frame to many stations at the same time
b. Sending a single frame to all routers to simultaneously update their routing tables
c. Sending a single frame to all routers at the same time
d. Sending a single frame to all hubs and bridges at the same time

6. Which of the following best describes a WAN?
*a. Connects LANs that are separated by a large geographic area
b. Connects workstations, terminals, and other devices in a metropolitan area
c. Connects LANs within a large building
d. Connects workstations, terminals, and other devices within a building

7. At which layers of the OSI reference model does a WAN operate?
a. The physical and application layers
*b. The physical and data link layers
c. The data link and network layers
d. The data link and presentation layers

8. How do WANs differ from LANs?
a. WANs typically exist in defined geographic areas.
b. WANs provide high-speed multiple-access services.
c. WANs use tokens to regulate network traffic.
*d. WANs use services of common carriers.

9. Which of the following best describes PPP?
a. It uses high-quality digital facilities and is the fastest WAN protocol.
b. It supports point-to-point and multipoint configurations and uses frame characters and checksums.
*c. It provides router-to-router and host-to-network connections over synchronous and asynchronous circuits.
d. It is a digital service that transmits voice and data over existing telephone lines.

10. Which of the following best describes ISDN?
*a. It is a digital service that transmits voice and data over existing phone lines.
b. It provides router-to-router and host-to-network connections over synchronous and asynchronous circuits.
c. It uses high-quality digital facilities and is the fastest WAN protocol.
d. It supports point-to-point and multipoint configurations and uses frame characters and checksums.

First Year Companion Guide - Chapter 5 - IP Addressing

1. How many bits are in an IP address?
a. 4
b. 8
c. 16
*d. 32

2. The network number plays what part in an IP address?
*a. It specifies the network to which the host belongs.
b. It specifies the identity of the computer on the network.
c. It specifies which node on the subnetwork is being addressed.
d. It specifies which networks the device can communicate with.

3. The host number plays what part in an IP address?
a. It designates the identity of the computer on the network.
*b. It designates which node on the subnetwork is being addressed.
c. It designates the network to which the host belongs.
d. It designates which hosts the device can communicate with.

4. What decimal number equals the binary number 11111111?
a. 8
b. 128
c. 254
*d. 255

5. What is a subnet?
a. A part of a network that acts as a slave system to the main network
b. A small network operating within a larger network that allows multiple types of devices to be networked
*c. A subdivision of a large network into smaller pieces
d. A small network that maintains the database of all MAC addresses on the network

6. In the address 182.54.4.233, which portion is the subnet?
a. 182
b. 54
*c. 4
d. 233

7. If a Class C network is subnetted with a mask of 255. 255. 255. 192, how many usable subnets are created?
*a. 2
b. 4
c. 6
d. 8

8. Given an IP host address of 192.168.5.121 and a subnet mask of 255.255.255.248, what is the network number of the host?
a. 192.168.5.12
b. 192.169.5.121
c. 192.169.5.120
*d. 192.168.5.120

9. Which portion of the IP address 205.129.12.5 represents the host?
a. 205
b. 205.129
*c. 5
d. 12.5

10. Which portion of the IP address 129.219.51.18 represents the network?
*a. 129.219
b. 129
c. 14.1
d. 1

First Year Companion Guide - Chapter 6 - ARP and RARP
1. Which Internet protocol is used to map an IP address to a MAC address?
a. TCP/IP
b. RARP
*c. ARP
d. AARP

2. Which of the following initiates an ARP request?
a. A device that is unable to locate the destination IP address in its ARP table
b. The RARP server, in response to a malfunctioning device
c. A diskless workstation with an empty cache
*d. A device that is unable to locate the destination MAC: address in its ARP table

3. Which of the following best describes an ARP table?
a. A method to reduce network traffic by providing lists of shortcuts and routes to common destinations
b. A way to route data within networks that are divided into subnetworks
c. A protocol that performs an application-layer conversion of information from one stack to another
*d. A section of RAM on each device that maps IP addresses to MAC addresses

4. Which of the following best describes the ARP reply?
*a. The process of a device sending its MAC address to a source in response to an ARP request
b. The route of the shortest path between the source and destination
c. The updating of ARP tables through intercepting and reading messages traveling on the network
d. The method of ending IP addresses based on the MAC address and used primarily by RARP servers

5. What are the two parts of the frame header called?
*a. The MAC header and the IP header
b. The source address and the ARP message
c. The destination address and the RARP message
d. The request and the data packet

6. Why are current, updated ARP tables important?
a. For testing links in the network
*b. For limiting the amount of broadcast
c. For reducing network administrator maintenance time
d. For resolving addressing conflicts

7. Why is a RARP request made?
*a. A source knows its MAC address but not its IP address.
b. The data packet needs to find the shortest route between destination and source.
c. The administrator needs to manually configure the system.
d. A link in the network faults and a redundant system must be activated.

8. What is in a RARP request?
*a. A MAC header, an IP header, and the RARP request message
b. A MAC header, a RARP header, and a data packet
c. A RARP header and MAC and IP addresses
d. A RARP header and an ARP trailer

9. Which of the following functions is unique to routers?
a. They bind MAC and IP addresses.
b. They receive broadcast messages and supply the requested information.
*c. They build ARP tables that describe all networks connected to them.
d. They reply to ARP requests.

10. What happens if a router cannot locate a destination address?
a. It consults the nearest name server that has a complete ARP table.
b. It sends an ARP request to the RARP server.
*c. It locates the MAC address of another router and forwards the data to that router.
d. It forwards the data packet to the nearest port, which queries the RARP server.

First Year Companion Guide - Chapter 7 - Topologies
1. Which of the following best describes topology?
a. A connection of computers, printers, and other devices for the purpose of communications
*b. The physical arrangement of network nodes and media within an enterprise networking structure
c. A network type that prevents collisions of data packets
d. A method for filtering network traffic to reduce the chance of bottlenecks and slowdowns

2. Which of the following best describes a star topology?
a. A LAN topology in which a central hub is connected by vertical cabling to other hubs that are dependent on it
b. A LAN topology in which transmissions from network stations propagate the length of the medium and are received by all other stations
*c. A LAN topology in which endpoints on a network are connected to a common central switch by point-to-point links
d. A LAN topology in which central points on a network are connected to a common central switch by linear links

3. Which of the following best describes an extended star topology?
*a. A LAN topology in which a central hub is connected by vertical cabling to other hubs that are dependent on it
b. A LAN topology in which transmissions from network stations propagate the length of the medium and are received by all other stations
c. A LAN topology in which endpoints on a network are connected to a common central switch by point-to-point links
d. A LAN topology in which central points on a network are connected to a common central switch by linear links

4. Which of the following best describes a terminator?
a. A section of network with only one route in and out
b. A device that quenches shorts before they reach expensive equipment
c. A device placed at network dead ends to bounce signals back through the network
*d. A device that provides electrical resistance at the end of a transmission line to absorb signals

5. How is the signal transmitted over a bus topology?

a. When a source transmits data over the networking media in a bus topology, the signal travels in a linear manner from the source.*b. When a source transmits data over the networking media in a bus topology, the signal travels in both directions from the source.
c. Signals on a bus topology are available only to the destination device on the LAN.
d. When a source transmits data over the networking media in a bus topology, the signal travels in one direction from the source.

6. How is a backoff issued on a bus topology network?
a. By the bridge closest to the collision
b. By the terminator
*c. By the NIC in each device on the segment where the collision occurred
d. By the route closest to the collision

7. What is one advantage to using a star topology?
*a. Great reliability
b. Natural redundancy
c. Low cost
d. Requires minimum amount of networking media

8. What is the maximum distance that a star topology could cover?
a. A 99-meter by 99-meter area
b. A 100-meter by 100-meter area
c. A 100-meter by 200-meter area
*d. A 200-meter by 200-meter area

9. What happens to the signal when horizontal cabling runs exceed the EIA/TIA 568B specified maximum length?
a. The transmission is interrupted.
*b. The transmission is weakened.
c. The transmission travels only the maximum distance and then stops.
d. The workstations do not send a message to a point that exceeds the maximum distance.

10. What can you do if the dimensions of the building exceed the maximum cable length?
a. Add a signal doubler.
b. Add more cable.
*c. Add repeaters.
d. Add another hub.

First Year Companion Guide - Chapter 8 - Structured Cabling and Electricity
1. Which grade of UTP cabling described in the EIA/TIA-568B standard is the one most frequently recommended and implemented in installations today?
a. Category 2
b. Category 3
c. Category 4
*d. Category 5

2. What type of fiber-optic cable is required by the EIA/TIA-568B standard for horizontal cabling?
a. Two-pair 100-ohm cable
b. Two-pair 150-ohm cable
*c. Two fibers of 62.5/125 µm multimode cable
d. Four fibers of 62.5/125 µm multimode cable

3. What kind of jack must be used for making a connection to a Category 5 UTP cable in a horizontal cabling scheme?
*a. RJ45
b. TIA 74
c. UTP 55
d. EIA 45

4. Why is a punch tool used?
a. To test the network connection
b. To securely fasten cable to drop ceiling supports
c. To attach labels to cables
*d. To make a good electrical connection between the cable and the jack

5. What is the cut sheet used for?
a. To keep cables orderly and unkinked
*b. To place appropriate numbers on telecommunications outlets and on the patch panel
c. To solve problems associated with crosstalk by consulting the appropriate table entry
d. To translate codes from IEEE to EIA and vice versa

6. What is the difference between an MDF and an IDF?
a. The MDF contains the primary network server and the major net-working devices, and the IDF contains only the necessary additional routers and repeaters.
b. The MDF is on the lowest floor in a multifloor network, and the IDF is on upper floors.
c. The MDF has all the hinges, hubs, routers, and ports needed for the network, and the IDF holds any needed repeaters.
*d. The MDF is the primary communications room and the central point in the network, and the IDF is the secondary communications room dependent on the MDF.

7. Which best describes a patch panel's function?
a. It serves as a temporary fix to network problems.
b. It acts as a hub for temporary short-term networks often found at conventions and shows.
*c. It acts as a switchboard where horizontal cabling from workstations can be connected to other workstations to form a LAN.
d. It serves as the center of a Token Ring network and controls the passing and redemption of tokens.

8. What do patch cords do?
*a. They cross-connect computers wired to the patch panel, which allows the LAN to function.
b. They serve as temporary boxes to network cabling problems.
c. They connect cabling together when changes in network configuration occur.
d. They allow the network administrator to reconfigure a LAN with a minimum of new cabling runs.

9. What is the purpose of grounding computing equipment?
*a. To prevent metal parts from becoming energized with a hazardous voltage resulting from a wiring fault inside the device
b. To connect the safety ground to exposed metal parts of the computing equipment so that minor surges in power can be diverted
c. To forestall the possibility that a power surge may corrupt the motherboard or the RAM
d. To prevent any power surge that might harm the end user from traveling through the computer

10. Which best describes a UPS?
a. It is a device that absorbs excess line voltage caused by lightning strikes.
*b. It is a backup device that provides power during a power failure.
c. It is a device that allows you to avoid rewiring the network when power fluctuations are continual.
d. It is a device that powers the multipath connection between computers.

First Year Companion Guide - Chapter 9 - The Application, Presentation, Session, and Transport Layers
1. What are the four upper layers of the OSI reference model?
*a. Application, presentation, session, and transport
b. Application, session, network, and physical
c. Physical, data link, network, and transport
d. Physical, network, transport, and application

2. Which layer of the OSI reference model supports communication between programs such as e-mail, file transfer, and Web browsers?
*a. The application layer
b. The presentation layer
c. The session layer
d. The transport layer

3. Which best describes flow control?
a. A method to manage limited bandwidth
b. A method of connecting two hosts synchronously
*c. A method to ensure data integrity
d. A method to check data for viruses prior to transmission

4. Which layer of the OSI reference model handles flow control and error recovery?
a. The application layer
b. The presentation layer
*c. The transport layer
d. The network layer

5. Which of the following best describes segmentation?
a. It breaks data into smaller packets for faster transmission.
b. It switches hosts from send mode to receive mode continuously during peak traffic periods.
*c. It allows multiple applications to share a transport connection.
d. It transfers data from the presentation layer to the network layer for encoding and encapsulation.

6. Which of the following controls the amount of information transferred end-to-end and helps enable TCP reliability?
a. Broadcasting
*b. Windowing
c. Error recovery
d. Flow control

7. Which layer of the OSI reference model can translate between different data formats, such as ASCII and EBCDIC?
a. The application layer
*b. The presentation layer
c. The session layer
d. The transport layer

8. Which of the following best describes the function of the presentation layer?
a. It establishes, manages, and terminates applications.
b. It supports communication between programs, such as e-mail, file transfer, and Web browsers.
c. It provides transport services from the host to the destination.
*d. It translates between different data formats, such as ASCII and EBCDIC.

9. ASCII, encryption, QuickTime, and Jpeg are all typical of which layer?
*a. The presentation layer
b. The transport layer
c. The application layer
d. The session layer

10. Which layer of the OSI reference model establishes, manages, and terminates communication between applications?
a. The application layer
b. The presentation layer
*c. The session layer
d. The transport layer

First Year Companion Guide - Chapter 10 - TCP/IP
1. Which of the following best describes TCP/IP?
*a. It is a suite of protocols that can be used to communicate across any set of interconnected networks.
b. It is a suite of protocols that allows LANs to connect into WANs.
c. It is a suite of protocols that allows for data transmission across a multitude of networks.
d. It is a suite of protocols that allows different devices to be shared by interconnected networks.

2. Which of the following best describes the purpose of TCP/IP protocol stacks?
a. They map closely to the OSI reference model's upper layers.
*b. They support all standard physical and data link protocols.
c. They transfer information in a sequence of datagrams.
d. They reassemble datagrams into complete messages at the receiving location.

3. Which of the following is one of the protocols found in the transport layer?
a. UCP
*b. UDP
c. TDP
d. TDC

4. What is the purpose of port numbers?
*a. They keep track of different conversations crossing the network at the same time.
b. Source systems use them to keep a session organized and to select the proper application.
c. End systems use them to dynamically assign end users to a particular session, depending on their application use.
d. Source systems generate them to predict destination addresses.

5. Why are TCP three-way handshake/open connections used?
*a. To ensure that lost data can be recovered if problems occur later

b. To determine how much data the receiving station can accept at one time
c. To provide efficient use of bandwidth by users
d. To change binary ping responses into information in the upper layers

6. What does a TCP sliding window do?
a. It makes the window larger so more data can come through at once, which results in more efficient use of bandwidth.
b. The window size slides to each section of the datagram to receive data, which results in more efficient use of bandwidth.
*c. It allows the window size to be negotiated dynamically during the TCP session, which results in more efficient use of bandwidth.
d. It limits the incoming data so that each segment must be sent one-by-one, which is an inefficient use of bandwidth.

7. UDP segments use what protocols to provide reliability?
a. Network-layer protocols
*b. Application-layer protocols
c. Internet protocols
d. Transmission Control Protocols

8. What is the purpose of ICMP testing?
*a. To determine whether messages reach their destination and, if they don't, to determine possible reasons why they did not
b. To make sure that all activity on the network is being monitored
c. To determine whether the network was set up according to the model
d. To determine whether the network is in control mode or user mode

9. Assuming the MAC is not in the ARP table, how does a sender find out the destination's MAC address?
a. It consults its routing table.
b. It sends a message to all the addresses, searching for the address.
*c. It sends out a broadcast message to the entire LAN.
d. It sends out a broadcast message to the entire network.

10. Which of the following best describes window size?
a. The maximum size of the window that software can have and still process data rapidly
*b. The number of messages that can be transmitted while awaiting an acknowledgment
c. The size of the window, in picas, that must be set ahead of time so data can be sent
d. The size of the window opening on a monitor, which is not always equal to the monitor size

First Year Companion Guide - Chapter 11 - The Network Layer and Routing
1. Which of the following best describes one function of Layer 3, the network layer, in the OSI model?
a. It is responsible for reliable network communication between nodes.
b. It is concerned with physical addressing and network topology.
*c. It determines which is the best path for traffic to take through the network.
d. It manages data exchange between presentation-layer entities.

2. What function allows routers to evaluate available routes to a destination and to establish the preferred handling of a packet?
a. Data linkage
*b. Path determination
c. SDLC interface protocol
d. Frame Relay

3. How does the network layer send packets from the source to the destination?
*a. By using an IP routing table
b. By using ARP responses
c. By referring to a name server
d. By referring to the bridge

4. What are the two parts of an address that routers use to forward traffic through a network?
*a. Network address and host address
b. Network address and MAC address
c. Host address and MAC address
d. MAC address and subnet mask

5. Which of the following best describes a routed protocol?
*a. It provides enough information to allow a packet to be forwarded from host to host.
b. It provides information necessary to pass data packets up to the next highest network layer.
c. It allows routers to communicate with other routers to maintain and update address tables.
d. It allows routers to bind MAC and IP addresses together.

6. Which of the following best describes a routing protocol?
*a. A protocol that accomplishes rooting through the implementation of an algorithm
b. A protocol that specifies how and when MAC and IP addresses are bound together
c. A protocol that defines the format and use of fields within a data packet
d. A protocol that allows a packet to be forwarded from host to host

7. What is one advantage of distance-vector algorithms?
a. They are not likely to count to infinity,
b. You can implement them easily on very large networks.
c. They are not prone to routing loops.
*d. They are computationally simple.

8. Which of the fallowing best describes a link-state algorithm?
*a. It re-creates the exact topology of the entire internetwork.
b. It requires minimal computations.
c. It determines distance and direction to any link on the internetwork.
d. It uses little network overhead and reduces overall traffic.

9. Why do routing loops occurs?
*a. Slow convergence occurs after a modification to the internetwork.
b. Split horizons are artificially created.
c. Network segments fail catastrophically and take other network segments down in a cascade effect.
d. Default routes were never established and initiated by the network administrator.

10. Which of the following best describes balanced hybrid routing?
*a. It uses distance vectors to determine best paths but topology changes trigger routing table updates.
b. It uses distance-vector routing to determine best paths between topology during high-traffic periods.
c. It uses topology to determine best paths but does frequent routing table updates.

d. It uses topology to determine best paths but uses distance vectors to circumvent inactive network links.

First Year Companion Guide - Chapter 12 - The Router User Interface and Modes

1. What are the two modes of access to router commands for Cisco routers?
*a. User and privileged
b. User and guest
c. Privileged and guest
d. Guest and anonymous

2. Which mode do you use to make router configuration changes on Cisco routers?
a. User
*b. Privileged
c. Administrator
d. Root

3. What does it mean if you see a greater-than symbol (>) on a Cisco router user interface?
a. You are in login mode.
b. You are in help mode.
*c. You are in user mode.
d. You are in privileged mode.

4. Which of the following is the privileged mode prompt for Cisco router user interfaces?
*a. #
b. >
c. <
d. |#

5. Which mode gives you access to a list of commonly used commands if ? is typed on a Cisco router user interface?
a. Guest
b. Privileged only
c. User only
*d. User and privileged

6. What does the - - More - - prompt at the bottom of a screen on a Cisco router user interface mean?
*a. Multiple screens are available as output.
b. Additional detail is available in the manual pages.
c. Multiple entries are required in the command.
d. Additional conditions must be stated.

7. Which keystroke(s) automatically repeats the previous command entry on a Cisco router user interface?
a. Left arrow
b. Right arrow
c. Ctrl-R
*d. Ctrl-P

8. What happens if you press the up arrow key in a Cisco router user interface?
a. You see a list of all users logged in to the router.
*b. You list the last command you typed.
c. You print the screen.
d. You pause the current process.

9. What happens if you type ? in a Cisco router user interface?
a. You see a list of all users logged in to the router.
b. You list the last command you typed.
*c. You enter the help system.
d. You find out which mode you are currently in.

10. What happens if you type show ? at the router prompt?
a. You get a list of the users currently on the router.
b. You get a list of all active connections and their status.
c. You get a list of the most recent router table.
*d. You get a list of the subcommands that are available within the show command.

First Year Companion Guide - Chapter 13 - Displaying Router Configuration Information
1. Which of the following describes a location from which a router is configured?
*a. Once installed on the network, a router can be configured from virtual terminals.
b. Upon initial configuration, a router is configured from the virtual terminals.
c. Once installed on the network, a router can he configured via modem from the console terminal.
d. Upon initial configuration, a router is configured via modem by using the auxiliary port.

2. Which of the following router components has these characteristics: holds the operating system and microcode, retains its contents when you power down or restart, and allows software updates without replacing chips?
a. NVRAM
b. RAM/DRAM
*c. Flash
d. ROM

3. Which of the following does not correctly describe the function of a router status command?
a. show version - Displays configuration of the system hardware, the names and sources of configuration files, and the boot images.
b. snow memory - Displays statistics about the router's memory, including memory free pool statistics.
*c. show buffers - Displays statistics for the buffer pools on the router.
d. Show interfaces - Displays statistics for all interfaces configured on the router.

4. Which of the following describes a function of the show startup-config command?
a. It allows an administrator to see the current running configuration on the router.
*b. It displays a message, showing how much nonvolatile memory has been used.
c. It allows an administrator to see the reason for the last system reboot.
d. It displays this message: Current Configuration.

5. The show interfaces serial command can display which of the following lines of information?
a. IOS (tm) 4500 Software (C4500-J-M), Experimental Version 11.2

b. DECNET routing is enabled
*c. Serial1 is up, line protocol is up
d. System image file is "c4500-j-mz"

6. Why would you use the show cdp neighbors command?
a. To get a snapshot view of the routers in the network
*b. To get an overview of the routers that are directly connected to the network
c. To get the IP addresses for neighboring routers
d. To build a routing table for all routers in the network neighborhood

7. What four important pieces of information do you receive after issuing a ping command?
*a. The size and quantity of ICMP packets; the timeout duration; the success rate; and the minimum, average, and maximum roundtrip times.
b. The quantity of ICMP packets; the timeout duration; the success rate; and the minimum, average, and maximum roundtrip times.
c. The size and quantity of ICMP packets; the MAC address; the success rate; and the minimum, average, and maximum roundtrip times.
d. The quantity of ICMP packets; the timeout duration; the transfer rate; and the minimum, average, and maximum roundtrip times.

8. What information does testing a network by using the trace command provide?
a. It determines whether the line protocol is operational.
b. It determines whether a routing table entry exists for the target network.
*c. It maps every router that a packet goes through to reach its destination.
d. It determines whether upper-layer applications are functioning properly,

9. What information does testing a network by using the show interfaces serial command provide?
*a. It displays line and data-link protocol status.
b. It displays how the router directs traffic across the network.
c. It displays the path that packets follow across the network.
d. It displays the names of routers on the network.

10. Which command is entered to display the router's active configuration file?
*a. show running-config
b. show config term
c. show version
d. show backup-config

First Year Companion Guide - Chapter 14 - Router Startup and Setup Configuration
1. Which of the following is the correct order of steps in the Cisco router system startup routine?
a. (1) Locate and load operating system; (2) load bootstrap; (3) test hardware; (4) locate and load configuration file
*b. (1) Test hardware; (2) load bootstrap; (3) locate and load operating system; (4) locate load configuration file
c. (1) Load bootstrap; (2) locate and load configuration file; (3) test hardware; (4) locate and load operating system
d. (1) Test hardware; (2) load bootstrap; (3) locate and load configuration file; (4) locate and load operating system

2. Which of the following is an important function of the power-up self-test?
a. To determine the router hardware and software components and list them on the console terminal
b. To cause other instructions to be loaded into memory
*c. To execute diagnostics that verify the basic operation of router hardware
d. To start routing processes, supply addresses for interfaces, and set up media characteristics

3. Which of the following is an important result of the Cisco IOS software loading onto a router?
*a. Determining the router hardware and software components and listing them on the console terminal
b. Causing other instructions to be loaded into memory
c. Executing diagnostics that verify the basic operation of router hardware
d. Starting routing processes, supplying addresses for interfaces, and setting up media characteristics

4. Which of the following is an important result of the configuration file loading onto a router?
a. Determining the router hardware and software components and listing them on the console terminal
b. Causing other instructions to be loaded into memory
c. Executing diagnostics that verify the basic operation of router hardware
*d. Starting routing processes, supplying addresses for interfaces, and setting up media characteristics

5. What is the function of the erase startup-config command?
*a. It deletes the backup configuration file in NVRAM.
b. It deletes the bootstrap image from Flash memory.
c. It deletes the current Cisco IOS software from NVRAM.
d. It deletes the current running configuration from Flash memory.

6. What is the function of the reload command?
a. It loads a backup configuration file from a TFTP server.
b. It saves the new Cisco IOS software to Flash memory.
*c. It reboots the router.
d. It loads the new configuration file in NVRAM.

7. When is router setup mode executed?
a. After the saved configuration file is loaded into main memory
b. When the network administrator needs to enter complex protocol features on the router
c. When the router begins software initialization
*d. When the router cannot find a valid configuration file

8. Which of the following correctly describes a procedure for setup of router global and interface parameters on a router?
a. A default parameter is shown in square brackets at every prompt.
*b. The router host name must be set.
c. An enable secret password can be set, but is not required.
d. For each installed interface, a series of questions must be answered.

9. Why might you want to issue show startup-config and show running-config commands?
a. It's time to update the Cisco IOS software and you need to kill certain router processes before proceeding.

b. To determine the time since the router booted and the current register setting.
*c. The router suddenly isn't working right and you want to compare the initial state to the present state.
d. To find out where the Cisco IOS software booted from and which version is being used.

10. What file(s) would you Find in NVRAM?
a. Cisco IOS software and configuration files
*b. Configuration files
c. A backup copy of Cisco IOS software
d. A limited version of Cisco IOS software and registry files

First Year Companion Guide - Chapter 15 - Router Configuration
1. Which of the following is not a function of the privileged EXEC [configure] command?
a. To configure a router from a virtual terminal
*b. To configure a TFTP server from a virtual terminal
c. To configure a router from the console terminal
d. To load a configuration from a network TFTP server

2. What is the function of the [configure memory] router command?
*a. It loads configuration information from NVRAM.
b. It erases the contents of NVRAM.
c. It stores in NVRAM the current configuration in RAM.
d. It displays the configuration saved in NVRAM.

3. What is the function of the [copy running-config startup-config] router command?
a. It loads configuration information from NVRAM.
b. It erases the contents of NVRAM.
*c. It stores in NVRAM the current configuration in RAM.
d. It displays the configuration saved in NVRAM.

4. If you want to completely back out of configuration mode, which of the following must you enters
a. [exit]
b. [no config-mode]
c. Ctrl-E
*d. Ctrl-Z

5. If you are planning to configure an interface, what prompt should be on the router?
a. router(config)#
b. router(config-in)#
c. router(config-intf)#
*d. router(config-if)#

6. Which of the following is a correct order for the process of configuring a router? (Assume that you have already made router changes in configuration mode.)
a. (1) Save changes to backup, (2) decide whether the changes are your intended results, (3) examine the results, and (4) examine the backup file.
*b. (1) Examine the results, (2) decide whether the changes are your intended results, (3) save the changes to backup, and (4) examine the backup file.
c. (1) Decide whether the changes are your intended results, (2) examine the backup file, (3) save the changes to backup, and (4) examine the results.

d. (1) Examine the results, (2) save the changes to backup, (3) decide whether the changes are your intended results, and (4) examine the backup file.

7. Which of the following is a command that can be used to save router configuration changes to a backups
*a. Router# [copy running-config tftp]
b. Router# [show running-config]
c. Router# [config mem]
d. Router# [copy tftp running-config]

8. Which of the following is not a command to remove router configuration changes.?
a. Router(config)# [no ...]
b. Router# [config mem]
*c. Router# [copy running-config startup-config]
d. Router# [copy tftp running-config]

9. Which of the following correctly describes password configuration on routers?
a. All passwords are established in privileged EXEC mode.
b. All passwords alter the password character string.
*c. A password can be established on all incoming Telnet sessions.
d. The [enable password] command restricts access to user EXEC mode.

10. Which of the following does not describe password configuration on routers?
*a. Passwords can be established in every configuration mode.
b. A password can be established on any console terminal.
c. The [enable secret] password uses an encryption process to alter the password character string.
d. All password establishment begins in global configuration mode.

First Year Companion Guide - Chapter 16 - Sources for Cisco IOS Software
1. Which of the following is the sequence used by the router for automatic fallback to locate the Cisco IOS software?
a. (1) Flash, (2) NVRAM, (3) TFTP server
b. (1) NVRAM, (2) TFTP server, (3) Flash
*c. (1) NVRAM, (2) Flash, (3) TFTP server
d. (1) TFTP server, (2) Flash, (3) NVRAM

2. Which of the following does not describe configuration register setting for Cisco IOS bootstrapping?
a. The order in which the router looks for system bootstrap information depends on the boot field setting.
b. You change the configuration register setting with the command [config-register].
c. You use a hexadecimal number when setting the configuration register boot field.
*d. Use the [show running-config] command to check the boot field setting.

3. Which of the following is not displayed by the Cisco IOS [show version] command?
*a. Statistics for configured interfaces
b. The type of platform running the Cisco IOS software
c. The configuration register setting
d. The Cisco IOS version

4. Which of the following is not part of specifying the fallback sequence to boot the Cisco IOS software?
a. Boot system commands are entered from global configuration mode.
*b. One boot system command is used to specify the entire fallback sequence.
c. The command [copy running-config startup-config] saves boot system commands to NVRAM.
d. Boot system commands are executed as needed during fallback in the order in which they were entered.

5. Which of the following correctly describes preparing to use a TFTP server to copy software to Flash memory?
*a. The TFTP server must be another router or a host system, such as a UNIX workstation or a laptop computer.
b. The TFTP host must be a system connected to an Ethernet network.
c. The name of the router containing the Flash memory must be identified.
d. The Flash memory must be enabled.

6. Which of the following is the fastest way to make sure the TFTP server is reachable prior to trying to transfer a Cisco IOS image file?
a. [trace] the TFTP server.
*b. [ping] the TFTP server.
c. [telnet] to the TFTP server.
d. Call the TFTP server administrator.

7. Why do you need to determine the file size of the Cisco IOS image on the TFTP server before transferring it to your router?
*a. To check that there is enough space in Flash to store the file
b. To verify that the file is the correct Cisco IOS version for your router
c. To complete a TFTP operation
d. To calculate the download time for the file and, thus, the amount of time the router will be out of service

8. Why do you create a Cisco IOS software image backup?
a. To verify that the copy in Flash is the same as the copy in ROM.
b. To provide a fallback copy of the current image prior to copying the image to a new router.
c. To create a fallback copy of the current image as part of the procedures during recovery from system failure.
*d. To create a fallback copy of the current image prior to updating with a new version.

9. Which of the following has a limited version of Cisco IOS software?
*a. ROM
b. Flash
c. TFTP server
d. ROM monitor

10. What is the command you need to issue if you want to upgrade an old version of the Cisco IOS by downloading a new image from the TFTP server?
a. boot system tftp 131.21.11.3
*b. copy tftp flash***
c. show flash
d. tftp ios.exe

1. Which of the following best describes the function of a broadcast address?
a. It sends a message to a single network destination.
b. It copies messages and sends them to a specific subnet of network addresses.
*c. It sends a message to all nodes on a network.
d. It sends a message to every node to which the router has access.

2. What is the purpose of using the [trace] command
a. It is the most complete test mechanism available.
b. It is a very basic testing mechanism.
c. It adds the IP address and the DNS to the router table.
*d. It locates failures in the path from the source to the destination.

3. What is the purpose of the [ip name-server] command?
*a. It defines which hosts can provide the name service.
b. It defines a naming scheme that allows a device to be identified by its location.
c. It identifies which TCP port to use when using the host name.
d. It generates messages from each router used along a datagram's path.

4. If you want to map a domain name to an IP address, what is the first thing you must do?
*a. Identify the host names.
b. Specify a name server.
c. Enable the DNS.
d. Refer to the DNS for the IP address of that device.

5. What is the purpose of the [no ip domain-lookup] command?
a. It defines which hosts can provide the name service.
b. It defines a naming scheme that allows a device to be identified by its location.
c. It turns on name-to-address translation in the router.
*d. It turns off name-to-address translation in the router.

6. Which of the following best describes the function of the show hosts command?
a. It identifies the subnet mask being used at the destination site.
b. It maintains a cache of host name-to-address mappings for use by EXEC commands.
*c. It is used to display a cached list of host names and addresses.
d. It shows the host name for the IP address.

7. What is the function of the [telnet] command?
*a. It verifies the application-layer software between source and destination stations.
b. It verifies the hardware connection and the logical address of the network layer.
c. It generates messages from each router used along the path.
d. It shows how many hours have passed since the software referred to the entry.

8. What is the function of the [ping] command?
a. It verifies the application-layer software between source and destination stations.
*b. It uses ICMP to verify the hardware connection and the logical address of the network layer.
c. It assigns values to generate messages from each router used along the path.
d. It gives descriptions of how information was sent and its current status.

9. Which command would you use to set up static [name-to-address] entries in the router's configuration file?
a. [ip perm]
b. [ip route]
c. [ip name]
*d. [ip host]

10. Which of the following best describes the function of the extended command mode of the [ping] command?
*a. It is used to specify the supported Internet header options.
b. It is used to specify the time frame for the [ping] return.
c. It is used to diagnose why a [ping] was delayed or not returned.
d. It is used to trace the datagram as it passes through each router.

First Year Companion Guide - Chapter 18 - Router Configuration and Routing Protocols: RIP and IGRP
1. What kind of entries does a router initially refer to?
*a. Entries about networks or subnets that are directly connected
b. Entries it has learned about from the Cisco IOS software
c. Entries whose IP address and mask information are known
d. Entries it has learned about from other routers

2. Which of the following best describes a static route?
a. A routing table entry that is used to direct frames for which a next hop is not explicitly listed in the routing table
*b. A route that is explicitly configured and entered into the routing table and takes precedence over routes chosen by dynamic routing protocols
c. A route that adjusts automatically to network topology or traffic changes
d. A route that adjusts involuntarily to direct frames within a network topology

3. Which of the following best describes a default route?
*a. A routing table entry that is used to direct frames for which a next hop is not explicitly listed in the routing table
b. A route that is explicitly configured and entered into the routing table
c. A route that adjusts automatically to network topology or traffic changes
d. A route that adjusts involuntarily to direct frames within a network topology

4. What are exterior routing protocols used for?
a. To transmit between nodes on a network
b. To deliver information within a single autonomous system
*c. To communicate between autonomous systems
d. To set up a compatibility infrastructure between networks

5. What are interior routing protocols used for?
a. They are used to set up a compatibility infrastructure between networks.
b. They are used to communicate between autonomous systems.
c. They are used to transmit between nodes on a network.
*d. They are used within a single autonomous system.

6. Which of the following is a global task?
a. Addressing IP network numbers by specifying subnet values
*b. Selecting a routing protocol - RIP or IGRP

c. Assigning network/subnet addresses and the appropriate subnet mask
d. Setting up a routing metric to find the best path to each network

7. What metric does RIP use to determine the best path for a message to travel on?
a. Bandwidth
*b. Hop count
c. Varies with each message
d. Administrative distance

8. You suspect that one of the routers connected to your network is sending bad routing information. What command can you use to check?
a. router(config)# [show ip protocol]
b. router# [show ip protocol]
*c. router> [show ip protocol]
d. router(config-router)# [show ip protocol]

9. Why would you display the IP routing table?
a. To set the router update schedule
*b. To identify destination network addresses and next-hop pairs
c. To trace where datagrams are coming from
d. To set the parameters and Filters for the router

10. If you wanted to learn which routing protocol a router was configured with, what command structure would you use?
a. router> [show router protocol]
b. router(config)> [show ip protocol]
c. router(config)# [show router protocol]
*d. router> [show ip protocol]

First Year Companion Guide - Chapter 19 - Network Management
1. What is the purpose of an inventory audit?
a. To identify the location of every network component
b. To monitor and analyze the network's performance
c. To collect vendor specification documents for every network component
*d. To take stock of all hardware and software on the network

2. What is the purpose of a facility audit?
a. To identify the types of hardware and devices on the network
*b. To identify the location of every network component
c. To monitor and analyze the network's performance
d. To transfer the information on a building's blueprints to cut sheets

3. How does a network map aid in locating problems with a network's physical components?
a. It provides the name of the user of the problem device.
b. It provides the settings on the problem device.
c. It provides operating requirements for applications used on the problem device.
*d. It provides addresses for the problem device.

4. Which of the following correctly describes SNMP?
a. SNMP is rarely used in new installations.
b. SNMP is a TCP/IP standard.
*c. SNMP uses a concept known as MIB.
d. SNMP is the best choice for networks with a large amount of traffic.

5. Which of the following correctly describes how CMIP functions?
a. It uses MIB polling.

*b. It has the central monitoring station wait for devices to report the current status.
c. It copies each device's local MIB.
d. The way it obtains information from devices contributes significantly to network traffic.

6. What is the purpose of an efficiency audit?
a. To monitor and analyze the network's performance
*b. To determine whether the network is performing to its potential
c. To identify the types of hardware and devices on the network
d. To provide information regarding emergency and disaster recovery

7. What is the purpose of a security audit?
a. To match security requirements with building and privacy codes
b. To assess the capabilities of clients to use the network hardware and software
c. To identify the network's ability to ensure integrity of data
*d. To identify the hardware and software system required for network security

8. After collecting performance data, what are the steps you would use to analyze and solve a network problem?
a. Determine whether the problem is periodic or constant; list possible causes; prioritize causes
b. Prioritize causes; identify cause using network management tools or the replacement method; track trends to anticipate future problems
*c. List possible causes; prioritize causes; identify cause using network management tools or the replacement method
d. Determine whether the problem can be replicated; prioritize possible causes; identify cause using network management tools or the replacement method

9. Which of the following is likely to be included in an evaluation report?
a. Identification of network hardware and software that does not conform to industry standards
*b. Logs indicating a trend toward a slower rate of traffic on certain segments of the network
c. A description of instances and the location of unauthorized access to files
d. A description of the types of users prone to experience difficulties using the network

10. What should a written request for change to improve network performance and security include?
*a. The rationale behind each change requested
b. The type, number, and location of each device on the network
c. A comparison of present performance and anticipated optimal performance
d. A breakdown of costs for equipment and labor

Engineering Journal and Workbook, Vol. 2 - Chapter 1 - Review: The OSI Reference Model and Routing
1. Which OSI layer supports a file transfer capability?
*a. Application layer
b. Network layer
c. Presentation layer
d. Session layer

2. What OSI layer negotiates data transfer syntax, such as ASCII?

a. Network layer
b. Application layer
c. Physical layer
*d. Presentation layer

3. Which OSI layer deals with session and connection coordination?
a. Physical layer
b. Data link layer
c. Transport layer
*d. Session layer

4. What OSI layer supports reliable connections for data transport services?
a. Session layer
b. Presentation layer
c. Physical layer
*d. Transport layer

5. At what layer does routing occur?
a. Session layer
*b. Network layer
c. Transport layer
d. Data link layer

Engineering Journal and Workbook, Vol. 2 - Chapter 2 - LAN Switching
1. Which of the following broadcast methods does an Ethernet medium use to transmit and receive data to all nodes on the network?
a. A packet
*b. A data frame
c. A segment
d. A byte at a time

2. What is the minimum time it takes Ethernet to transmit 1 byte?
a. 100 ns
*b. 800 ns
c. 51,200 ns
d. 800 ms

3. Characteristics of microsegmentation include which of the following?
a. Dedicated paths between sender and receiver hosts
b. Multiple traffic paths within the switch
c. All traffic visible on network segment at once
*d. a and b

4. LAN switches are considered to be which of the following?
a. Multiport repeaters operating at Layer 1
b. Multiport hubs operating at Layer 2
c. Multiport routers operating at Layer 3
*d. Multiport bridges operating at Layer 2

5. Asymmetric switching is optimized for which of the following?
*a. Client/server network traffic where the "fast" switch port is connected to the server
b. An even distribution of network traffic
c. Switches without memory buffering
d. a and b

6. In _____ switching, the switch checks the destination address and immediately begins forwarding the frame, and in _____ switching, the switch receives the complete frame before forwarding it.

a. store-and-forward; symmetric
*b. cut-through; store-and-forward
c. store-and-forward; cut-through
d. memory buffering; cut-through

Engineering Journal and Workbook, Vol. 2 - Chapter 3 - VLANs
1. The phrase microsegmentation with scalability means which of the following?
*a. The ability to increase networks without creating collisions domains
b. The ability to put a huge number hosts on one switch
c. The ability to broadcast to more nodes at once
d. All of the above

2. Switches, as the core element of VLANs, provide the intelligence to do which of the following?
a. They group users, ports, or logical addresses into a VLAN.
b. They make filtering and forwarding decisions.
c. They communicate with other switches and routers.
*d. All of the above.

3. Each _____ segment connected to a _____ port can be assigned to only one VLAN.
a. switch; hub
b. hub; router
*c. hub; switch
d. LAN; hub

4. Which of the following is not an advantage of using static VLANS?
a. They are secure.
b. They are easy to configure.
c. They are easy to monitor.
*d. They automatically configure ports when new stations are added.

5. Which of the following is not a criterion on which VLANs can be based?
a. Port ID and MAC address
b. Protocol
c. Application
*d. All of the above are criterion by which VLANs can be created

6. Which of the following is a beneficial effect of adding a VLAN?
*a. Switches do not need to be configured.
b. Broadcasts can be controlled.
c. Confidential data can be protected.
d. Physical boundaries that prevent user groupings can be removed.

Engineering Journal and Workbook, Vol. 2 - Chapter 4 - LAN Design
1. Which of the following is likely to cause congestion?
a. Internet access
b. Central database access
c. Video and image transmission
*d. All of the above

2. Which of the following is not a cause of excessive broadcasts?
a. Too many client packets looking for services
b. Too many server packets announcing services
c. Too many routing table updates
*d. Too many network segments

3. A primary data link - layer design goal is the selection of _____ devices, such as bridges or LAN switches, used to connect _____ media to form LAN segments.
a. Layer 3; Layer 2
b. Layer 1; Layer 2
*c. Layer 2; Layer 1
d. Layer 2; Layer 3

4. Which of the following specifications for 10BaseT is wrong?
a. Data rate = 10 Mbps
*b. Max length = 400 meters
c. Signaling method = baseband
d. Media = Category 5 UTP

5. Which of the following are benefits of implementing Layer 3 devices in your LAN?
a. Allows segmentation of the LAN into unique physical and logical networks
b. Filters data-link broadcasts and multicasts and allows for WAN connectivity
c. Provide logical structure to the network
*d. All of the above

Engineering Journal and Workbook, Vol. 2 - Chapter 5 - Routing Protocols IGRP
1. After a router determines which path to use for a packet, it can then proceed with which of the following?
a. A broadcast
b. Storing the packet in a routing table
c. Choosing a routing protocol
*d. Switching the packet

2. The success of dynamic routing depends on which of the following?
a. Manually entering routes
b. Maintaining a routing table
c. Periodic routing updates
*d. b and c

3. _____ routing protocols determine the direction and distance to any link in the internetwork; _____ routing protocols are also called shortest path first.
*a. Distance-vector; link-state
b. Distance-vector; hybrid
c. Link-state; distance-vector
d. Dynamic; static

4. Which of the following is not a variable IGRP uses to determine a composite metric?
a. Bandwidth
b. Delay
c. Load
*d. IGRP uses all of these

5. To select IGRP as a routing protocol, which command do you use?
a. show igrp
b. router network igrp
c. enable igrp
*d. router igrp

Engineering Journal and Workbook, Vol. 2 - Chapter 6 - ACLs
1. Which of the following commands would you use to find out whether there are any ACLs set on an interface?
a. show running-config
b. show ip protocols
*c. show ip interface
d. show ip network

2. What do you call the additional 32 bits of information in the access-list statement?
*a. Wildcard bits
b. Access bits
c. Zero bits
d. One bits

3. Using Router (config)# access-list 156.1.0.0 0.0.255.255 is equivalent to saying which of the following?
a. "Deny my network only"
b. "Permit a specific host"
*c. "Permit my network only"
d. " deny a specific host"

4. When you issue a permit entry into an ACL that is accompanied by an implicit deny all, all traffic except that listed in the permit statement will be denied.
*a. True
b. False
c.
d.

5. The show access-lists command is used to do which of the following?
a. Monitor whether ACLs are set
*b. Monitor ACL statements
c. Monitor ACL debugging
d. Monitor groupings

Engineering Journal and Workbook, Vol. 2 - Chapter 7 - IPX
1. A Novell IPX address has 80 bits: 32 for the _____ and 48 for the _____.
a. network number; IP address
b. node number; MAC address
*c. network number; node number
d. MAC address; node number

2. When you configure an IPX network, you may need to specify an encapsulation type on which of the following?
a. Just the Novell servers
b. Just the Cisco routers
c. Sometimes a and b
*d. Always a and b

3. Novell NetWare uses _____ to facilitate the exchange of routing information and _____ to advertise network services.
a. NCP; RIP
*b. RIP; SAP
c. SPX; NCP
d. SAP; RIP

4. The syntax for configuring Novell IPX globally is which of the following?

*a. ipx routing [node]
b. router ipx
c. ipx route [node]
d. router rip

5. Fill in the commands: _____ displays IPX status and parameters; _____ displays the contents of the IPX routing table; and _____ lists servers discovered through SAP advertisements.
a. show ipx traffic; show ipx route; show ipx routing activity
*b. show ipx interface; show ipx route; show ipx servers
c. show ipx interface; show ipx; show ipx servers
d. show ipx; show ipx route; show ipx

Engineering Journal and Workbook, Vol. 2 - Chapter 8 - WANs
1. How many data paths are used by WAN data-link protocols to frames to carry frames between systems?
a. Two
*b. One
c. Four
d. Undetermined

2. At what layer of the OSI reference model would you find the DCE or DTE equipment?
a. Network layer
b. Data link layer
*c. Physical layer
d. Transport layer

3. A CSU/DSU is generally used as what type of equipment?
a. Router
b. DTE
c. Switch
*d. DCE

4. Which of the following encapsulation types are associated with synchronous serial lines?
a. PPP
b. HDLC
c. Frame Relay
*d. All of the above

5. What encapsulation type would you select for a link if speed were the most important factor?
*a. Frame Relay
b. PPP
c. HDLC
d. SLIP

6. Devices that are located at a service subscriber's site are referred to as what?
a. Customer owned equipment
b. Subscriber devices
*c. Customer premises equipment
d. Subscriber premises equipment

7. The WAN path between DTEs is known as what?
a. The link
b. The circuit
c. The channel
*d. All of the above

8. Which WAN services can be used with a router?
a. Frame Relay
b. ISDN
c. PPP
*d. All of the above

9. Which of the following is an example of a packet-switched protocol?
a. ISDN
*b. Frame Relay
c. PPP
d. HDLC

10. Which protocol does PPP use for establishing and maintaining point-to-point connections?
a. HDLC
*b. LCP
c. LAPD
d. Cisco IETF

Engineering Journal and Workbook, Vol. 2 - Chapter 9 - WAN Design
1. Which of the following are initial concerns in a WAN design?
a. Determining whether data outside the company is accessed
b. Determining who is involved in the design from the customer standpoint
c. Determining where shared data resides and who uses it
*d. All of the above

2. When analyzing network load requirements, you should check worst-case traffic load during what time of the day?
*a. The busiest time
b. The least busiest time
c. During network backups
d. After regular work hours

3. When designing the WAN, where should application servers be placed?
a. On the enterprise backbone
*b. Close to the users
c. Near the point of presence
d. Anyplace the designer chooses

4. Which of the following is not a benefit of a hierarchical design model?
a. Scalability
b. Ease of implementation
*c. A flat topology
d. Ease of troubleshooting

5. In most cases, when designing the core layer, your main concern should be which of the following?
*a. Efficient use of bandwidth
b. Workgroup access
c. Server placement
d. Enterprise server placement

6. Which of the following would be placed on the network backbone?
a. Server
*b. Routers
c. Workstations
d. Application servers

7. Which layer connects users into the LAN?
a. Workgroup
b. Core
*c. Access
d. Distribution

8. Which layer connects a LAN into a WAN link?
a. Distribution
b. Workgroup
c. Core
*d. Access

9. In a one-layer design, the placement of what device becomes extremely important?
*a. Server
b. Router
c. Workstation
d. Switch

10. In a two-layer design, what device would you use to segment the LAN into individual broadcast domains?
a. Switches
*b. Routers
c. Hubs
d. Repeaters

Engineering Journal and Workbook, Vol. 2 - Chapter 10 - PPP
1. Which of the following is the network-layer protocol supported by PPP?
a. Novell IPX
b. TCP/IP
c. Apple Talk
*d. All of the above

2. In a PPP frame, what field identifies whether you have encapsulated IPX or TCP/IP?
a. Flag
b. Control
*c. Protocol
d. FCS

3. When you're running PPP, LCP is responsible for which of the following?
*a. Establishment, maintenance, and termination of the point-to-point connection
b. Maintenance of several links
c. Router updates
d. Compression

4. What type of handshaking occurs when PAP is the selected PPP authentication protocol?
a. One-way
*b. Two-way
c. Three-way
d. Four-way

5. What command on the router can you use to check the LCP and NCP states for PPP?
a. router> show interfaces

b. router(config)# show interfaces
*c. router# show interfaces
d. router(config-if)# show interfaces

Engineering Journal and Workbook, Vol. 2 - Chapter 11 - ISDN
1. At the central site, what device can be used to provide the connection for dial-up access?
a. Switch
*b. Router
c. Bridge
d. Hub

2. For which of the following locations would ISDN service not be adequate?
*a. A large concentration of users at site
b. A small office
c. A single-user site
d. None of the above

3. Protocols that begin with E are used to specify what?
*a. Telephone network standards
b. Switching and signaling
c. ISDN concepts
d. It is not used with ISDN.

4. If you want to use CHAP for authentication when using ISDN, what protocol should you select?
a. HDLC
b. SLIP
*c. PPP
d. PAP

5. On a router, which of the following commands do you use to set the ISDN switch type?
a. Router> isdn switch-type
b. Router# isdn switch-type
c. Router(config-if)# isdn switch-type
*d. Router(config)# isdn switch-type

Engineering Journal and Workbook, Vol. 2 - Chapter 12 - Frame Relay
1. How does Frame Relay handle multiple conversations on the same physical connection?
a. It duplexes the conversations.
*b. It multiplexes the circuits.
c. It converts it to an ATM cell.
d. Multiple conversations are not allowed.

2. Which of the following protocols are used by Frame Relay for error correction?
a. Physical and data-link protocols
*b. Upper-layer protocols
c. Lower-layer protocols
d. Frame Relay does not do error correction.

3. Which of the following does Frame Relay do to make its DLCIs global?
a. It broadcasts them.
b. It sends out unicasts.
*c. It sends out multicasts.
d. DLCIs can't become global.

4. Which of the following is the data rate at which the Frame Relay switch agrees to transfer data?
*a. Committed information rate
b. Data transfer rate
c. Timing rate
d. Baud Rate

5. Which of the following assigns DLCI numbers?
a. The end user
b. The network root
c. A DLCI server
*d. The service provider

6. DLCI information is included in which of the following fields of the Frame Relay header?
a. The flag field
*b. The address field
c. The data field
d. The checksum field

7. Which of the following does Frame Relay use to keep PVCs active?
a. Point-to-point connections
b. Windows sockets
*c. Keepalives
d. They become inactive.

8. How does Frame Relay use Inverse ARP requests?
a. It maps IP addresses to MAC addresses.
b. It maps MAC addresses to IP addresses.
c. It maps MAC addresses to network addresses.
*d. It uses the IP address-to-DLCI mapping table.

9. Which of the following does Frame Relay use to determine the next hop?
a. An ARP table
b. A RIP routing table
*c. A Frame Relay map
d. An IGRP routing table

10. For which of the following does Frame Relay use split horizon?
a. To increase router updates
*b. To prevent routing loops
c. To raise convergence times
d. Frame Relay does not use split horizon.

Second Year Companion Guide - Chapter 1 - Review: The OSI Reference Model and Routing
1. Which OSI reference model layer best describes 10BaseT standards?
A. The data link layer
B. The network layer
*C. The physical layer
D. The transport layer

2. Which of the following best describes the function of the transport layer of the OSI reference model?
*A. It sends data by using Aow control.
B. It provides the best path for delivery.
C. It determines network addresses.
D. It allows for network segmentation.

3. Which of the following functions does a router use to relay data packets between networks?
A. Application and media
*B. Path determination and switching
C. Broadcast and collision detect
D. None of the above

4. Which of the following are two basic types of dynamic routing?
A. Static and default
B. TCP and UDP exchange
*C. Distance vector and link state
D. None of the above

5. When all the routers in a network are operating with the same knowledge, the network is said to have done which of the following?
*A. Converged
B. Formalized
C. Reconfigured
D. None of the above

Second Year Companion Guide - Chapter 2 - LAN Switching
1. Which of the following broadcast methods does an Ethernet medium use to transmit and receive data to all nodes on the network?
A. A packet
*B. A data frame
C. A segment
D. A byte at a time

2. What is the minimum time it takes Ethernet to transmit 1 byte?
A. 100 ns
*B. 800 ns
C. 51,200 ns
D. 800 microseconds

3. Characteristics of microsegmentation include which of the following?
A. Dedicated paths between sender and receiver hosts
B. Multiple traffic paths within the switch
C. All traffic visible on network segment at once
*D. A and B

4. LAN switches are considered to be which of the following?
A. Multiport repeaters operating at Layer 1
B. Multiport hubs operating at Layer 2
C. Multiport routers operating at Layer 3
*D. Multiport bridges operating at Layer 2

5. Asymmetric switching is optimized for which of the following?
*A. Client/server network traffic where the “fast” switch port is connected to the server
B. An even distribution of network traffic
C. Switches without memory buffering
D. A and B

6. In _____ switching, the switch checks the destination address and imme-diately begins forwarding the frame, and in _____ switching, the switch receives the complete frame before forwarding it.
A. store-and-forward; symmetnc
*B. cut-through; store-and-forward
C. store-and-forward; cut-through

D. memory buffering; cut-through

7. The Spanning-Tree Protocol allows which of the following?
A. Routers to communicate link states
B. Switches to communicate hop counts
C. Bridges to communicate Layer 3 information
*D. Redundant network paths without suffering the effects of loops in the network

Second Year Companion Guide - Chapter 3 - VLANs
1. The phrase microsegmentation with scalability means which of the following?
*A. The ability to increase networks without creating collisions domains
B. The ability to put a huge number of hosts on one switch
C. The ability to broadcast to more nodes at once
D. All of the above

2. Switches, as the core element of VLANs, provide the intelligence to do which of the following?
A. They group users, ports, or logical addresses into a VLAN.
B. They make filtering and forwarding decisions.
C. They communicate with other switches and routers.
*D. All of the above.

3. Each _____ segment connected to a _____ port can be assigned to only one VLAN.
A. switch; hub
B. hub; router
*C. hub; switch
D. LAN; hub

4. Which of the following is not an advantage of using static VLANS?
A. They are secure.
B. They are easy to configure.
C. They are easy to monitor.
*D. They automatically configure ports when new stations are added.

5. Which of the following is not a criterion on which VLANs can be based?
A. Port ID and MAC address
B. Protocol
C. Application
*D. All of the above are criteria on which VLANs can be based

6. Which of the following is a beneficial effect of adding a VLAN?
*A. Switches do not need to be configured.
B. Broadcasts can be controlled.
C. Confidential data can be protected
D. Physical boundaries that prevent user groupings can be removed.

Second Year Companion Guide - Chapter 4 - LAN Design
1. Which of the following is likely to cause congestion?
A. Internet access
B. Central database access
C. Video and image transmission
*D. All of the above

2. Which of the following is not a cause of excessive broadcasts?
A. Too many client packets looking for services

B. Too many server packets announcing services
C. Too many routing table updates
*D. Too many network segments

3. A primary data-link design goal is the selection of _____ devices, such as bridges or LAN switches, used to connect _____ media to form LAN segments.
A. Layer 3; Layer 2
B. Layer 1; Layer 2
*C. Layer 2; Layer 1
D. Layer 2; Layer 3

4. Which of the following specifications for 10BaseT is wrong?
A. Data rate = 10 Mbps
*B. Max length = 400 meters
C. Signaling method = baseband
D. Media = Category 5 UTP

5. Which of the following are benefits of implementing Layer 3 devices in your LAN:
A. Allows segmentation of the LAN into unique physical and logical networks
B. Filters data-link broadcasts and multicasts and allows for WAN connectivity
C. Provides logical structure to the network
*D. All of the above

Second Year Companion Guide - Chapter 5 - Routing Protocols IGRP
1. After a router determines which path to use for a packet, it can then proceed with which of the following?
A. A broadcast
B. Storing the packet in a routing table
C. Choosing a routing protocol
*D. Switching the packet

2. The success of dynamic routing depends on which of the following?
A. Manually entering routes
B. Maintaining a routing table
C. Periodic routing updates
*D. B and C

3. routing protocols determine the direction and distance to any link: in the internetwork; routing protocols are also called shortest path first.
*A. Distance-vector; link-state
B. Distance-vector; hybrid
C. Link-state; distance-vector
D. Dynamic; static

4. Which of the following is not a variable IGRP uses to determine a composite metric?
A. Bandwidth
B. Delay
C. Load
*D. IGRP uses all of these.

5. To select IGRP as a routing protocol, which command do you use?
A. show igrp
B. router network igrp
C. enable igrp

*D. router igrp

Second Year Companion Guide - Chapter 6 - ACLs
1. Which of the following commands would you use to find out whether there are any ACLs set on an interface?
A. show running-config
B. show ip protocols
*C. show ip interface
D. show ip network

2. What do you call the additional 32 bits of information in the access-list statement?
*A. Wildcard bits
B. Access bits
C. Zero bits
D. One bits

3. Using Router(config)# access-list 156.1.0.0 0.0.255.255 is equivalent to saying which of the following?
A. "Deny my network only"
B. "Permit a specific host"
*C. "Permit my network only"
D. "deny a specific host"

4. When you issue a permit entry into an ACL that is accompanied by an implicit deny all, all traffic except that listed in the permit statement will be denied.
*A. True
B. False
C.
D.

5. The show access-lists command is used to do which of the following?
A. Monitor whether ACLs are set
*B. Monitor ACL statements
C. Monitor ACL debugging
D. Monitor groupings

Second Year Companion Guide - Chapter 7 - Novell IPX
1. A Novell IPX address has 80 bits: 32 for the _____ and 48 for the _____.
A. network number; IP address
B. node number; MAC address
*C. network number; node number
D. MAC address; node number

2. When you configure an IPX network, you may need to specify an encapsulation type on which of the following?
A. Just the Novell servers
B. Just the Cisco routers
C. Sometimes A and B
*D. Always A and B

3. Novell NetWare uses _____ to facilitate the exchange of routing information and _____ to advertise network services.
A. NCP; RIP
*B. RIP; SAP
C. SPX; NCP
D. SAP; RIP

4. The syntax for configuring Novell IPX globally is which of the following?
*A. ipx routing [node]
B. router ipx
C. ipx route [node]
D. router rip

5. Fill in the commands: _____ displays IPX status and parameters; _____ displays the contents of the IPX routing table; and _____ lists servers discovered through SAP advertisements.
A. show ipx traffic; show ipx route; show ipx routing activity
*B. show ipx interface; show ipx route; show ipx servers
C. show ipx interface; show ipx; show ipx servers
D. show ipx; show ipx route; show ipx

Second Year Companion Guide - Chapter 8 - WANs
1. How many data paths are used by WAN data-link protocols to frames to carry frames between systems?
A. Two
*B. One
C. Four
D. Undetermined

2. At what layer of the OSI reference model would you find the DCE or DTE equipment?
A. The network layer
B. The data link layer
*C. The physical layer
D. The transport layer

3. A CSU/DSU generally is used as what type of equipment?
A. Router
B. DTE
C. Switch
*D. DCE

4. Which of the following encapsulation types is associated with synchronous serial lines?
A. PPP
B. HDLC
C. Frame Relay
*D. All of the above

5 What encapsulation type would you select for a link if speed were the most important factor?
*A. Frame Relay
B. PPP
C. HDLC
D. SLIP

6. Devices that are located at a service subscriber's site are referred to as what?
A. Customer owned equipment
B. Subscriber devices
*C. Customer premises equipment
D. Subscriber premises equipment

7. The WAN path between DTEs is known as what?
A. The link

B. The circuit
C. The channel
*D. All of the above

8. Which WAN services can be used with a router?
A. Frame Relay
B. ISDN
C. PPP
*D. All of the above

9. Which of the following is an example of a packet-switched protocol?
A. ISDN
*B. Frame Relay
C. PPP
D. HDLC

10. Which protocol does PPP use for establishing and maintaining point-to-point connections?
A. HDLC
*B. LCP
C. LAPD
D. Cisco IETF

Second Year Companion Guide - Chapter 9 - WAN Design
1. Which of the following are initial concerns in a WAN design?
A. Determining whether data outside the company is accessed
B. Determining who is involved in the design from the customer standpoint
C. Determining where shared data resides and who uses it
*D. All of the above

2. When analyzing network load requirements, you should check worst-case traffic load during what time of the day?
*A. The busiest time
B. The least busiest time
C. During network backups
D. After regular work hours

3. When designing the WAN, where should application servers be placed?
A. On the enterprise backbone
*B. Close to the users
C. Near the point of presence
D. Any place the designer chooses

4. Which of the following is not a benefit of a hierarchical design model?
A. Scalability
B. Ease of implementation
*C. A flat topology
D. Ease of troubleshooting

5. In most cases, when designing the core layer, your main concern should be which of the following?
*A. Efficient use of bandwidth
B. Workgroup access
C. Server placement
D. Enterprise server placement
. Which of the following would be placed on the network backbones?
A. Server
*B. Routers

C. Workstations
D. Application servers

7. Which layer connects users into the LAN?
A. Workgroup
B. Core
*C. Access
D. Distribution

8. Which layer connects a LAN into a WAN link?
A. Distribution
B. Workgroup
C. Core
*D. Access

9. In a one-layer design, the placement of what device becomes extremely important?
*A. Server
B. Router
C. Workstation
D. Switch

10. In a two-layer design, what device would you use to segment the LAN into individual broadcast domains?
A. Switches
*B. Routers
C. Hubs
D. Repeaters

Second Year Companion Guide - Chapter 10 - PPP
1. Which of the following is the network-layer protocol supported by PPP?
A. Novell IPX
B. TCP/IP
C. Apple Talk
*D. All of the above

2. NCPs are used by PPP to do which of the following?
A. Establish links
*B. Encapsulate multiple protocols
C. Convert packets into cells
D. Establish connections

3. In a PPP frame, what field identifies whether you have encapsulated IPX or TCP/IP?
A. Flag
B. Control
*C. Protocol
D. FCS

4. When you're running PPP, LCP is responsible for which of the following?
*A. Establishment, maintenance, and termination of the point-to-point connection
B. Maintenance of several links
C. Router updates
D. Compression

5. How many phases are involved in PPP session establishment?
A. Two

B. Three
*C. Four
D. One

6. What type of handshaking occurs when PAP is the selected PPP authentication protocol?
A. One-way
*B. Two-way
C. Three-way
D. Four-way

7. What command on the router can you use to check the LCP and NCP states for PPP?
A. router> show interfaces
B. router(config)# show interfaces
*C. router# show interfaces
D. router(config-if)# show interfaces

8. When would PPP most likely be used at a local workstation for Internet connectivity?
A. When the workstation is directly connected to a LAN
B. When the workstation is directly connected to a router
*C. When the workstation needs dialup access to the Internet
D. It will never be used on a workstation

Second Year Companion Guide - Chapter 11 - ISDN
1. What is the top speed at which ISDN operates?
A. 64 kbps
*B. 128 kbps
C. 256 kbps
D. 512 kbps

2. How many B channels does ISDN use?
A. 1
*B. 2
C. 3
D. 4

3. How many D channels does ISDN use?
*A. 1
B. 2
C. 3
D. 4

4. Which ISDN service provider must provide the phone number and what type of identification number?
A. An SPPN
B. An SPIN
C. An SPDN
*D. An SPID

5. Which channel does ISDN use for call setup?
A. The A Channel
B. The B Channel
C. The C Channel
*D. The D Channel

6. At the central site, what device can be used to provide the connection for dialup access?
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C. Bridge
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B. Router# isdn switch-type
C. Router(config-if)# isdn switch-type
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Second Year Companion Guide - Chapter 12 - Frame Relay
1. How does Frame Relay handle multiple conversations on the same physical connection?
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