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

____ 1. Which statement describes an advantage of networks?
   a. Networks require decentralized management.
   b. Isolating network devices decreases costs.
   c. Isolating network devices allows implementation of the sneakernet file sharing method.
   d. Networks enable multiple users to share resources.

____ 2. A ____ facilitates communication and resource sharing between other computers on the network.
   a. servlet
   b. workstation
   c. personal computer
   d. server

____ 3. ____ networks are the most popular type of network for medium- and large-scale organizations.
   a. Client/server
   b. Peer-to-peer
   c. Stand-alone
   d. Stationary

____ 4. A ____ network is confined to a relatively small space.
   a. NAN
   b. MAN
   c. WAN
   d. LAN

____ 5. Often, separate LANs are interconnected and rely on several ____ running many different applications and managing resources other than data.
   a. workstations
   b. servers
   c. clients
   d. stand-alone computers

____ 6. A ____ network connects clients and servers from multiple buildings.
   a. NAN
   b. MAN
   c. WAN
   d. TAN

____ 7. A ____ is a specialized device that allows multiple networks or multiple parts of one network to connect and exchange data.
   a. segment
   b. host
   c. node
   d. connectivity device

____ 8. Which network topology is the most common?
   a. ring
   b. star
   c. hybrid
   d. Ethernet

____ 9. ____ are the distinct units of data that are exchanged between nodes on a network.
   a. Segments
   b. Packets
   c. Topologies
   d. Protocols

____ 10. The phenomenon of offering multiple types of communications services on the same network is known as ____.
    a. convergence
    b. unified communications
    c. divergence
    d. multi-communications

____ 11. Which type of service supports e-mail?
    a. management
    b. communications
    c. access
    d. file
12. Security auditing is handled by ____.
   a. network management services  
   b. communication services  
   c. access services  
   d. Internet services  

13. Dependability is a characteristic of ____.
   a. soft skills  
   b. network communications  
   c. technical skills  
   d. network servers  

14. ____ is a popular career development tool for job seekers and a measure of an employee’s qualifications for employers.
   a. Certification  
   b. Evaluation  
   c. Degree auditing  
   d. Apprenticeship  

15. The ____ is a specialized United Nations agency that provides developing countries with technical expertise and equipment to advance those nations’ technological bases.
   a. ANSI  
   b. ISO  
   c. ITU  
   d. ISOC  

16. In which OSI model layer does TCP operate?
   a. Physical  
   b. Transport  
   c. Network  
   d. Data Link  

17. Transport layer protocols break large data units into ____.
   a. PDUs  
   b. segments  
   c. frames  
   d. block IDs  

18. In which OSI model layer does IP operate?
   a. Physical  
   b. Transport  
   c. Network  
   d. Data Link  

19. Which Data Link sublayer manages flow control?
   a. LLC  
   b. MAC  
   c. Management layer  
   d. Addressing layer  

20. Which Data Link sublayer manages access to the physical medium?
   a. LLC  
   b. MAC  
   c. Management layer  
   d. Addressing layer  

21. In which OSI model layer do hubs operate?
   a. Physical  
   b. Network  
   c. Data Link  
   d. Physical and Data Link  

22. A digital signal composed of a pulse of positive voltage represents a(n) ____.
   a. 0  
   b. 1  
   c. 4  
   d. 8  

23. The byte 00001110 means ____ on a digital network.
   a. 3  
   b. 6  
   c. 14  
   d. 30  

24. In modulation, a simple wave called a(n) ____ wave, is combined with another analog signal to produce a unique signal that gets transmitted from one node to another.
   a. carrier  
   b.  
   c. information
25. When signals are free to travel in both directions over a medium simultaneously, the transmission is considered ____.
   a. simplex
   b. multiplex
   c. half-duplex
   d. full-duplex

26. ____ is a technology used with fiber-optic cable, which enables one fiber-optic connection to carry multiple light signals simultaneously.
   a. Statistical multiplexing
   b. WDM (wavelength division multiplexing)
   c. TDM (time division multiplexing)
   d. FDM (frequency division multiplexing)

27. The data transmission characteristic most frequently discussed and analyzed by networking professionals is ____.
   a. noise
   b. scalability
   c. throughput
   d. cost

28. One of the most common transmission flaws affecting data signals is ____.
   a. noise
   b. attenuation
   c. throughput
   d. latency

29. The most significant factor in choosing a transmission method is its ____.
   a. noise
   b. attenuation
   c. throughput
   d. latency

30. Modern LANs use ____ or higher wiring.
   a. Cat 3
   b. Cat 5
   c. RG-6
   d. RG-59

31. Serial refers to a style of data transmission in which the pulses that represent bits follow one another along a ____ transmission line.
   a. long
   b. short
   c. secondary
   d. single

32. ____ describes a popular serial data transmission method.
   a. EIA/TIA Commercial Building Wiring Standard
   b. EIA/TIA RS-232 (Recommended Standard 232)
   c. EIA/TIA 568A standard
   d. EIA/TIA 568BA standard

33. Which term describes the hardware that makes up the enterprise-wide cabling system?
   a. wiring board
   b. patch panel
   c. network diagram
   d. cable plant

34. The points where circuits interconnect with other circuits is known as ____.
   a. entrance facilities
   b. cross-connect facilities
   c. IDF (intermediate distribution frame)
   d. telecommunications closet

35. A(n) ____ number is the address on a host where an application makes itself available to incoming or outgoing data.
   a. port
   b. source
   c. destination
   d. application
36. **UDP** is more efficient than TCP for carrying messages that fit within one data packet.
   a. IP  c. ICMP
   b. UDP  d. IGMP

37. The subprotocol that enables TCP/IP to internetwork—that is, to traverse more than one LAN segment and more than one type of network through a router is **IP**.
   a. TCP  c. UDP
   b. ICMP  d. IP

38. In the TCP/IP protocol suite, **IP** is the core protocol responsible for logical addressing.
   a. TCP  c. IP
   b. UDP  d. ARP

39. In IPv4 addressing, a node with an IP address of 168.34.88.29 belongs to a Class **C** network.
   a. A  c. C
   b. B  d. D

40. In dotted decimal notation, a(n) **period** separates each decimal.
   a. dash  c. colon
   b. slash  d. period

41. In most cases, BOOTP has been surpassed by the more sophisticated IP addressing utility, **DHCP**.
   a. DNS  c. DHCP
   b. RARP  d. APIPA

42. In IPv6, each address contains a(n) **Variable Prefix**, or a variable-length field at the beginning of the address that indicates what type of address it is.
   a. Variable Prefix  c. Format Prefix
   b. Address Prefix  d. Field Prefix

43. If the standard port number for the Telnet service is 23, a host whose IPv4 address is 10.43.3.87 has a socket address for Telnet of **10.43.3.87:23**.
   a. 10.43.3.87/23  c. 10.43.3.87-23
   b. 10.43.3.87:23  d. 23:10.43.3.87

44. In the domain name www.google.com, **com** is the top-level domain (TLD).
   a. http  c. google
   b. www  d. com

45. **Telnet** is a utility that can verify that TCP/IP is installed, bound to the NIC, configured correctly, and communicating with the network.
   a. ARP  c. Telnet
   b. PING  d. FTP

46. A physical topology **depicts** a network in broad scope.
   a. specifies device types  c. specifies connectivity methods
   b. depicts a network in broad scope  d. specifies addressing schemes

47. Without **terminators**, a bus network would suffer from signal bounce.
   a. hubs  c. terminators
   b. repeaters  d. jamming

48. In a ring network, each workstation acts as a(n) **hub** for the transmission.
49. A ____ is simply a linked series of devices.
   a. repeater  
   b. amplifier 
   c. terminator 
   d. manager

50. In packet switching, when packets reach their destination node, the node ____ them based on their control information.
   a. disassembles 
   b. deletes 
   c. reassembles 
   d. separates

51. Collectively, MPLS labels are sometimes called a ____.
   a. header 
   b. shim 
   c. frame 
   d. title

52. All Ethernet networks, independent of their speed or frame type, use an access method called ____.
   a. CSMA 
   b. CSMA/DC 
   c. CSAM/CD 
   d. CSMA/CD

53. On an Ethernet network, a(n) ____ is the portion of a network in which collisions occur if two nodes transmit data at the same time.
   a. collision domain 
   b. crash domain 
   c. interference domain 
   d. duplicate domain

54. The most common 1-Gigabit Ethernet standard in use today is ____.
   a. 1000Base-T 
   b. 1000Base-SX 
   c. 10GBase-SR 
   d. 1000Base-LX

55. Within Ethernet frame types, the ____ signals to the receiving node that data is incoming and indicates when the data flow is about to begin.
   a. FCS 
   b. header 
   c. preamble 
   d. frame

56. Together, the FCS and the header make up the ____-byte “frame” for the data.
   a. 15 
   b. 18 
   c. 21 
   d. 24

57. NICs contain a(n) ____ which transmits and receives data signals.
   a. keyboard port 
   b. mouse port 
   c. data transceiver 
   d. antenna

58. By far, the most popular expansion board NIC today is one that uses a(n) ____ bus.
   a. onboard 
   b. PCIe 
   c. ExpressCard 
   d. ISA

59. PCIe slots vary depending on the number of ____ they support.
   a. lanes 
   b. labels 
   c. cards 
   d. processors

60. Each time a computer starts up, the device drivers for all its connected peripherals are loaded into ____.
   a. ROM 
   b. EEPROM 
   c. RAM 
   d. CMOS
61. In addition to viewing its LEDs and using a loopback plug to test a NIC’s functionality, you can also check a NIC’s connectivity with ____.
   a. simple commands  
   b. special clients  
   c. special switches  
   d. special software

62. Repeaters operate in the ____ layer of the OSI model.
   a. Physical  
   b. Network  
   c. Transport  
   d. Session

63. A ____ can interpret physical addressing information.
   a. repeater  
   b. switch  
   c. hub  
   d. bridge

64. Switches that operate anywhere between Layer 4 and Layer 7 are also known as ____ switches.
   a. peripheral  
   b. STP  
   c. content  
   d. multiport

65. The individual geographic locations connected by a WAN are known as ____.
   a. WAN sites  
   b. WAN links  
   c. network service providers  
   d. central offices

66. Because WAN connections require routers or other Layer 3 devices to connect locations, their links are not capable of carrying ____ protocols.
   a. open  
   b. standard  
   c. routable  
   d. nonroutable

67. On most modern WANs, a ring topology relies on ____ rings to carry data.
   a. flexible  
   b. open  
   c. serial  
   d. redundant

68. ____ WANs are the most fault-tolerant type of WAN because they provide multiple routes for data to follow between any two points.
   a. Bus  
   b. Star  
   c. Mesh  
   d. Tiered

69. The ____ encompasses the entire telephone system, from the wires that enter homes and businesses to the network centers that connect different regions of a country.
   a. SLIP  
   b. POTS  
   c. PPP  
   d. PSTN

70. The portion of the PSTN that connects any residence or business to the nearest CO is known as the ____.
   a. demarcation point  
   b. NIU (Network Interface Unit)  
   c. local loop  
   d. central office

71. ____ means that a telephone company connects residential users to its network with fiber-optic cable.
   a. OLT  
   b. FITL  
   c. PON  
   d. FITH

72. ____ is an updated, digital version of X.25 that also relies on packet switching.
   a. DSL  
   b. ISDN  
   c. Frame relay  
   d. ATM

73. A ____ converts digital signals into analog signals for use with ISDN phones and other analog devices.
   a. terminal adapter  
   b. smart jack
74. ISDN PRI uses ____ B channels and one 64-Kbps D channel.
   a. 10  c. 23
   b. 12  d. 32

75. A ____ aggregates multiple DSL subscriber lines and connects them to the carrier’s CO.
   a. terminal adapter  c. smart jack
   b. DSLAM  d. terminator

76. Broadband cable requires many subscribers to share the same local line, thus raising concerns about ____ and actual (versus theoretical) throughput.
   a. access  c. noise
   b. costs  d. security

77. The data rate of a particular SONET ring is indicated by its ____ , a rating that is internationally recognized by networking professionals and standards organizations.
   a. OC (Optical Carrier) level  c. BRI (Basic Rate Interface)
   b. CIR (committed information rate)  d. DS0 (digital signal, level 0)

78. A directional antenna issues wireless signals along a(n) ____ direction.
   a. open  c. wide
   b. narrow  d. single

79. ____ is a significant problem for wireless communications because the atmosphere is saturated with electromagnetic waves.
   a. Attenuation  c. Diffraction
   b. Fading  d. Interference

80. In ____ wireless systems, the transmitting antenna focuses its energy directly toward the receiving antenna which results in a point-to-point link.
   a. mobile  c. fixed
   b. variable  d. open

81. An 802.11g antenna has a geographic range of ____ meters.
   a. 20  c. 300
   b. 100  d. 330

82. ____ may use either the 2.4-GHz or 5-GHz frequency range.
   a. 802.11a  c. 802.11g
   b. 802.11b  d. 802.11n

83. ____ is an 802.11n network feature allowing the combination of multiple frames into one larger frame.
   a. Channel bonding  c. Frame aggregation
   b. Channel aggregation  d. Frame bonding

84. Most satellites circle the Earth ____ miles above the equator in a geosynchronous orbit.
   a. 100  c. 6,000
   b. 1240  d. 22,300

85. To establish a satellite Internet connection, each subscriber must have a ____.
   a. dish antenna  c. dish pathway
   b. line-of-sight antenna  d. source pathway
86. In ____ addressing, the network information portion of an IPv4 address is limited to the first 8 bits in a Class A address.
   a. classful  
   b. subnet  
   c. stateful  
   d. limited

87. In classful addressing, Class C IPv4 address host information is located in the ____.
   a. last 8 bits  
   b. last 16 bits  
   c. first 8 bits  
   d. first 16 bits

88. When using classful IPv4 addressing, a network ID always ends with an octet of ____.
   a. 0  
   b. 00000000  
   c. 1  
   d. 255

89. The ____ gateway is the gateway that first interprets its outbound requests to other subnets, and then interprets its inbound requests from other subnets.
   a. proxy  
   b. core  
   c. Internet  
   d. default

90. The gateways that make up the Internet backbone are called ____ gateways.
   a. proxy  
   b. core  
   c. Internet  
   d. default

91. The most popular mail server programs are Sendmail and ____.
   a. Eudora  
   b. Microsoft Outlook  
   c. AOL mail  
   d. Microsoft Exchange Server

92. SMTP operates from port ____.
   a. 25  
   b. 11  
   c. 110  
   d. 250

93. POP3 (Post Office Protocol, version 3) relies on TCP and operates over port ____.
   a. 25  
   b. 11  
   c. 110  
   d. 250

94. The ____ utility allows you to view a host’s routing table.
   a. nbstat  
   b. pathping  
   c. dig  
   d. route

95. ____ is the most widely implemented virtualization software today.
   a. Hyper-V  
   b. Citrix  
   c. VirtualBox  
   d. VMware

96. To connect to a network, a virtual machine requires a ____.
   a. virtual switch  
   b. virtual adapter  
   c. physical switch  
   d. virtual MAC address

97. Upon creation, each vNIC is automatically assigned a ____.
   a. MAC address  
   b. switch address  
   c. block address  
   d. reference address

98. ____ connect vNICs with a network, whether virtual or physical.
   a. Virtual routers  
   b. Virtual crossovers  
   c. Virtual duplexers  
   d. Virtual bridges
99. ____ refers to dialing directly into a private network’s or ISP’s remote access server to log on to a network.
   a. Dialed networking
   b. Traditional networking
   c. Dial-up networking
   d. Virtual networking

100. ____ is an open source system designed to allow one workstation to remotely manipulate and receive screen updates from another workstation.
   a. Remote Desktop
   b. VNC
   c. Citrix
   d. Xen

101. In a ____ VPN, tunnels connect multiple sites on a WAN.
   a. site-to-site
   b. site-to-client
   c. client-to-client
   d. link-to-line

102. On network diagrams, the Internet is frequently depicted as a ____.
   a. block
   b. cloud
   c. line
   d. lightning bolt

103. In ____ , each datagram can follow one of many paths to reach its destination.
   a. circuit switching
   b. line switching
   c. packet switching
   d. data switching

104. ____ desktops are desktop operating environments hosted virtually, on a different physical computer from the one with which the user interacts.
   a. Virtual
   b. Physical
   c. Material
   d. Guest

105. ____ is a social engineering practice in which a person attempts to glean access or authentication information by posing as someone who needs that information.
   a. Cracking
   b. Hacking
   c. War driving
   d. Phishing

106. ____ software searches a node for open ports.
   a. Phishing
   b. Sniffing
   c. Authentication
   d. Port scanner

107. A router that is not configured to drop packets that match certain or suspicious characteristics is an example of a risk associated with ____.
   a. people
   b. transmission and hardware
   c. protocols and software
   d. Internet access

108. A ____ attack occurs when a system becomes unable to function because it has inundated with requests for services and can’t respond to any of them.
   a. flashing
   b. denial-of-service
   c. war driving
   d. phishing

109. A ____ firewall is a router (or a computer installed with software that enables it to act as a router) that examines the header of every packet of data it receives to determine whether that type of packet is authorized to continue to its destination.
   a. packet-filtering
   b. gateway
   c. proxy
   d. selective

110. A ____ attack occurs when a hacker uses programs that try a combination of a user ID and every word in a dictionary to gain access to the network.
   a. flashing
   b. dictionary
b. denial-of-service  
d. brute force

111. A ___ attack occurs when a hacker tries numerous possible character combinations to find the key that will decrypt encrypted data.
   a. flashing  
b. denial-of-service  
c. dictionary  
d. brute force

112. The use of certificate authorities to associate public keys with certain users is known as ___.
   a. PGP  
b. PKI  
c. IPSec  
d. SSL

113. A VPN ___ authenticates VPN clients and establishes tunnels for VPN connections.
   a. router  
b. service  
c. concentrator  
d. certificate authority

114. RADIUS and TACACS belong to a category of protocols known as AAA (___).
   a. access, authorization, and accounting  
b. authentication, authorization, and accounting  
c. authentication, authorization, and authority  
d. authentication, authorization, and access

115. ___ is the use of one network to simultaneously carry voice, video, and data communications.
   a. Multicasting  
b. Unicasting  
c. Divergence  
d. Convergence

116. IPTV, videoconferencing, streaming video, and IP multicasting belong to the range of services known as ___.
   a. voice over IP  
b. data over IP  
c. video over IP  
d. Web over IP

117. ___ messaging is a service that makes several forms of communication available from a single user interface.
   a. Unified  
b. Instant  
c. Diversified  
d. Open

118. Using VoIP over a WAN allows an organization to avoid paying long-distance telephone charges, a benefit known as ___.
   a. charge bypass  
b. distance bypass  
c. toll bypass  
d. easypass

119. In general, a(n) ___ is a private switch that accepts and interprets both analog and digital voice signals.
   a. IP-PBX  
b. analog PBX  
c. Data PBX  
d. IT-PBX

120. When a caller uses an IP telephone, his or her voice is immediately digitized and issued from the telephone to the network in ___ form.
   a. segment  
b. frame  
c. circuit  
d. packet

121. ___ signaling functions are more limited than those performed by the protocols in the H.323 group.
   a. RTCP  
b. MGCP  
c. MEGACO  
d. SIP

122. SIP and H.323 regulate ___ for VoIP or video-over-IP clients and servers.
a. call signaling only  
b. control only  
c. call signaling and control  
d. communication between media gateways

123. A(n) ____ is a computer that manages multiple media gateways.
   a. MPLS  
b. MGCP  
c. MEGACO  
d. MGC

124. Many network engineers consider ____ to be superior to MGCP.
   a. SIP  
b. RTCP  
c. MEGACO  
d. MGC

125. ____ are often considered first-level support.
   a. Help desk coordinators  
b. Help desk analysts  
c. Administrators  
d. Network specialists

126. ____ is one of the most important aspects to consider when looking at how a problem solution might affect users and network functionality.
   a. Cost  
b. Scope  
c. Scalability  
d. Security

127. A ____ is a document (preferably online) that lists every service and software package supported within an organization, plus the names of first- and second-level support contacts for those services or software packages.
   a. call tracking list  
b. help desk program list  
c. supported services list  
d. change management list

128. A ____ system is a process or program that provides support personnel with a centralized means of documenting changes to the network.
   a. release management  
b. asset management  
c. change document  
d. change management

129. A ____ is a small electronic device that issues a signal on a wire pair.
   a. tone locator  
b. probe kit  
c. tone generator  
d. probe

130. ____ is a fundamental property of wire that depends on a wire’s molecular structure and size.
   a. Voltage  
b. Current  
c. Resistance  
d. Impedance

131. Resistance is measured in ____.
   a. ohms  
b. hertz  
c. centimeters  
d. volts

132. When used on a copper-based cable, a continuity tester applies a small amount of ____ to each conductor at one end of the cable.
   a. resistance  
b. impedance  
c. voltage  
d. current

133. The danger in using a ____ is that it could collect more information than you or the machine can reasonably process.
   a. cable continuity tester  
b. multimeter  
c. protocol analyzer  
d. wireless network tester
134. A ____ is a program that runs automatically, without requiring a person to start or stop it.
   a. virus  c. bot
   b. worm    d. Trojan horse

135. A(n) ____ virus disguises itself as a legitimate program to prevent detection.
   a. stealth  c. time dependent
   b. encrypted  d. polymorphic

136. ____ detects malware by comparing current characteristics of files and disks against an archived version of these characteristics to discover any changes.
   a. Integrity checking  c. Signature
   b. Polymorphic  d. Heuristic

137. A(n) ____ is a deviation from a specified level of system performance for a given period of time.
   a. fault  c. error
   b. failure  d. hoax

138. ____ is a specialized storage device or group of storage devices that provides centralized fault-tolerant data storage for a network.
   a. NAS  c. SANs
   b. RAID  d. Optical media

139. ____ are distinct networks of storage devices that communicate directly with each other and with other networks.
   a. NAS  c. SANs
   b. RAID  d. Optical media

140. ____ is a type of media capable of storing digitized data and that uses a laser to write data to it and read data from it.
   a. Tape backup media  c. Fiber optic media
   b. Optical media  d. USB

141. A(n) ____ is a graphical representation of a network’s devices and connections.
   a. Multi Router Traffic Grapher  c. wiring schematic
   b. network diagram  d. event viewer

142. A(n) ____ is a graphical representation of a network’s wired infrastructure.
   a. Multi Router Traffic Grapher  c. wiring schematic
   b. network diagram  d. event viewer

143. ____ management refers to monitoring how well links and devices are keeping up with the demands placed on them.
   a. Performance  c. Network
   b. Fault  d. Configuration

144. ____ management refers to the detection and signaling of device, link, or component faults.
   a. Performance  c. Network
   b. Fault  d. Configuration

145. The process where one network management console collects data from multiple networked devices at regular intervals is known as ____.
   a. base lining  c. polling
   b. interrogating  d. pushing
146. A network management agent is a _____ that collects information about a device’s operation and provides it to the network management application.
   a. software routine  
   b. hardware device  
   c. GUI  
   d. probe

147. _____ involves manipulating certain characteristics of packets, data streams, or connections to manage the type and amount of traffic traversing a network or interface at any moment.
   a. Traffic monitoring  
   b. Traffic routing  
   c. Traffic polling  
   d. Traffic shaping

148. _____ is the local storage of frequently needed files that would otherwise be obtained from an external source.
   a. Swapping  
   b. Paging  
   c. Caching  
   d. Segmentation

149. A _____ is a correction, improvement, or enhancement to a software application.
   a. revision  
   b. change  
   c. patch  
   d. software upgrade

150. A networked _____ is perhaps the simplest device to add.
   a. workstation  
   b. hub  
   c. printer  
   d. server