

SYSTEM MCQs COLLECTION



NSCT Prep

Free MCQ Practice for NSCT Test Preparation



Computer Networks & Cloud Computing

900 Multiple Choice Questions

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Easy Questions

300 questions

Q1. What is the primary purpose of data communication?

- A. To exchange data between two devices
- B. To design hardware circuit boards
- C. To store data permanently on disks
- D. To compile programs into binaries

Answer: A

Q2. Which of the following is NOT a component of a data communication system?

- A. Compiler
- B. Receiver
- C. Sender
- D. Protocol

Answer: A

Q3. In simplex mode of data transmission, data flows in:

- A. One direction only
- B. Both directions at once
- C. Both ways but alternating
- D. Multiple directions

Answer: A

Q4. Which transmission mode allows data to flow in both directions simultaneously?

- A. Half-duplex
- B. Multiplex
- C. Simplex
- D. Full-duplex

Answer: D

Q5. What does bandwidth refer to in data communication?

- A. The count of devices on the network
- B. The physical width of the cable used
- C. The range of frequencies a channel passes
- D. The length of the transmission medium

Answer: C

Q6. Walkie-talkie is an example of which transmission mode?

- A. Full-duplex
- B. Half-duplex
- C. Simplex
- D. Automatic

Answer: B

Q7. Which of the following is a guided transmission medium?

- A. Infrared
- B. Microwaves
- C. Radio waves
- D. Twisted pair

Answer: D

Q8. What is the unit of data transmission speed?

- A. Amperes (A)
- B. Hertz (Hz)
- C. Watts (W)
- D. Bits per second (bps)

Answer: D

Q9. In data communication, what is a protocol?

- A. A hardware device on a NIC
- B. A software application suite
- C. A set of rules for data exchange
- D. A type of transmission cable

Answer: C

Q10. Which signal type has a continuous varying pattern?

- A. Analog signal
- B. Digital signal
- C. Binary signal
- D. Discrete signal

Answer: A

Q11. What type of network covers a small geographical area like a single building?

- A. LAN
- B. PAN
- C. MAN
- D. WAN

Answer: A

Q12. Which topology connects all devices to a single central cable?

- A. Star
- B. Ring
- C. Mesh
- D. Bus

Answer: D

Q13. How many layers does the OSI model have?

- A. 6
- B. 4
- C. 7
- D. 5

Answer: C

Q14. Which device operates at the physical layer to regenerate signals?

- A. Switch
- B. Repeater
- C. Gateway
- D. Router

Answer: B

Q15. Which network topology provides the highest redundancy?

- A. Full mesh topology
- B. Bus topology
- C. Star topology
- D. Ring topology

Answer: A

Q16. Which layer of the OSI model is responsible for routing?

- A. Data link layer
- B. Network layer
- C. Physical layer
- D. Transport layer

Answer: B

Q17. What does WAN stand for?

- A. Wide Access Node
- B. Wireless Area Network
- C. Web Access Network
- D. Wide Area Network

Answer: D

Q18. In which switching technique is a dedicated path established before data transfer?

- A. Circuit switching
- B. Cell switching
- C. Message switching
- D. Packet switching

Answer: A

Q19. Which networking device connects two different networks and operates at the network layer?

- A. Hub
- B. Router
- C. Repeater
- D. Switch

Answer: B

Q20. What is the TCP/IP model also known as?

- A. Internet model
- B. IEEE model
- C. OSI model
- D. ISO model

Answer: A

Q21. What is the main function of the data link layer?

- A. Node-to-node delivery of frames
- B. Routing packets between networks
- C. Physical signal encoding
- D. End-to-end message delivery

Answer: A

Q22. What is a MAC address?

- A. A port number for applications
- B. A physical address burned into a NIC
- C. An IP address used for routing
- D. A logical address assigned by software

Answer: B

Q23. How many bits are in a MAC address?

- A. 32 bits
- B. 48 bits
- C. 128 bits
- D. 64 bits

Answer: B

Q24. Which error detection method appends a calculated value at the end of the data?

- A. All of the above
- B. Parity check only
- C. Hamming code only
- D. CRC method only

Answer: A

Q25. What does CSMA/CD stand for?

- A. Carrier Sense Media Access with Collision Detection
- B. Central Station Multiple Access with Collision Detection
- C. Carrier Sense Multiple Access with Collision Detection
- D. Carrier Signal Multiple Access with Collision Division

Answer: C

Q26. Which sublayer of the data link layer controls access to the shared medium?

- A. Physical sublayer
- B. Network sublayer
- C. LLC sublayer
- D. MAC sublayer

Answer: D

Q27. What is framing in the data link layer?

- A. Assigning IP addresses to each host
- B. Dividing data into units called frames
- C. Converting digital signals to analog form
- D. Encrypting data for secure transfer

Answer: B

Q28. Which protocol is used to resolve an IP address to a MAC address?

- A. DNS
- B. RARP
- C. DHCP
- D. ARP

Answer: D

Q29. Simple parity check can detect which type of errors?

- A. Only even number of bit errors
- B. Only odd number of bit errors
- C. All types of errors in data
- D. Only burst errors in frames

Answer: B

Q30. In Ethernet, what happens when a collision is detected?

- A. Data is retransmitted right away immediately
- B. The entire network shuts down completely
- C. Devices wait a random time then retransmit
- D. The frame is discarded permanently by all

Answer: C

Q31. What is the size of an IPv4 address?

- A. 64 bits
- B. 128 bits
- C. 16 bits
- D. 32 bits

Answer: D

Q32. What is the main function of a router?

- A. Storing web pages on servers
- B. Forwarding packets between networks
- C. Providing wireless network access
- D. Connecting devices within a LAN

Answer: B

Q33. Which class of IPv4 addresses is used for multicasting?

- A. Class B
- B. Class D
- C. Class C
- D. Class A

Answer: B

Q34. What does the TTL field in an IP header stand for?

- A. Transfer Type Label
- B. Transmission Time Limit
- C. Total Transfer Length
- D. Time to Live

Answer: D

Q35. Which protocol is used to send error messages at the network layer?

- A. UDP
- B. TCP
- C. ARP
- D. ICMP

Answer: D

Q36. What is the default subnet mask for a Class C IPv4 address?

- A. 255.255.0.0
- B. 255.255.255.255
- C. 255.0.0.0
- D. 255.255.255.0

Answer: D

Q37. Which IP address range is reserved for loopback testing?

- A. 169.254.0.0/16
- B. 127.0.0.0/8
- C. 10.0.0.0/8
- D. 192.168.0.0/16

Answer: B

Q38. What tool uses ICMP echo requests to test connectivity?

- A. traceroute
- B. nslookup
- C. ping
- D. netstat

Answer: C

Q39. Which of the following is a private IPv4 address?

- A. 11.0.0.1
- B. 172.32.0.1
- C. 8.8.8.8
- D. 192.168.1.1

Answer: D

Q40. What is the purpose of NAT (Network Address Translation)?

- A. To translate private IPs to public IPs
- B. To compress packets for transfer
- C. To assign domain names to hosts
- D. To encrypt data during transit

Answer: A

Q41. Which two protocols operate at the transport layer?

- A. ARP and RARP
- B. IP and ICMP
- C. HTTP and FTP
- D. TCP and UDP

Answer: D

Q42. Which transport layer protocol provides reliable, connection-oriented service?

- A. IP
- B. ICMP
- C. UDP
- D. TCP

Answer: D

Q43. What is the range of port numbers?

- A. 0 to 49151
- B. 0 to 1023
- C. 0 to 65535
- D. 1 to 65535

Answer: C

Q44. Which well-known port is used by HTTP?

- A. 25
- B. 80
- C. 21
- D. 443

Answer: B

Q45. What type of service does UDP provide?

- A. Unreliable, connectionless
- B. Reliable, connectionless
- C. Reliable, connection-oriented
- D. Unreliable, connection-oriented

Answer: A

Q46. How many steps are in the TCP three-way handshake?

- A. 5
- B. 4
- C. 2
- D. 3

Answer: D

Q47. What is a socket in networking?

- A. A routing protocol name
- B. A type of cable connector
- C. A physical port on a device
- D. An IP address plus port number

Answer: D

Q48. Which application typically uses UDP?

- A. DNS queries
- B. Web browsing
- C. Email sending
- D. File transfer

Answer: A

Q49. What does the checksum field in the UDP header provide?

- A. Error detection
- B. Flow control
- C. Congestion control
- D. Packet sequencing

Answer: A

Q50. What is the purpose of the transport layer?

- A. Network-to-network routing
- B. Node-to-node frame delivery
- C. Signal encoding on media
- D. Process-to-process delivery

Answer: D

Q51. What does DNS stand for?

- A. Digital Network Standard
- B. Data Network Service
- C. Domain Name System
- D. Dynamic Name Server

Answer: C

Q52. Which protocol is used to send emails?

- A. FTP
- B. SMTP
- C. IMAP
- D. POP3

Answer: B

Q53. What port does FTP use for control connection?

- A. 23
- B. 21
- C. 22
- D. 20

Answer: B

Q54. What is HTTP?

- A. A routing protocol for networks
- B. An email delivery protocol
- C. A file transfer protocol only
- D. A protocol for transferring web pages

Answer: D

Q55. Which protocol is used to retrieve emails from a mail server while keeping them on the server?

- A. SMTP
- B. IMAP
- C. POP3
- D. FTP

Answer: B

Q56. Which port does SSH use?

- A. 25
- B. 21
- C. 22
- D. 23

Answer: C

Q57. What is Telnet used for?

- A. Remote login
- B. Email sending
- C. Web browsing
- D. File transfer

Answer: A

Q58. What does URL stand for?

- A. Universal Reference Locator
- B. Universal Resource Locator
- C. Uniform Resource Locator
- D. Unified Resource Link

Answer: C

Q59. Which protocol does a web browser use to access websites?

- A. FTP protocol
- B. SMTP protocol
- C. Telnet protocol
- D. HTTP/HTTPS

Answer: D

Q60. What is the role of a DNS resolver?

- A. Encrypting data for transfer
- B. Sending emails between servers
- C. Hosting websites on servers
- D. Translating domain names to IPs

Answer: D

Q61. What does Wi-Fi stand for?

- A. Wireless Fidelity standard
- B. Wide Field technology
- C. It is a brand name only
- D. Wired Fixture protocol

Answer: C

Q62. Which IEEE standard defines Wi-Fi?

- A. IEEE 802.16
- B. IEEE 802.11
- C. IEEE 802.15
- D. IEEE 802.3

Answer: B

Q63. What frequency band does Bluetooth primarily operate on?

- A. 900 MHz
- B. 60 GHz
- C. 5 GHz
- D. 2.4 GHz

Answer: D

Q64. What is an Access Point (AP) in a wireless network?

- A. A type of directional antenna used
- B. A wireless client device on the network
- C. A device bridging wireless to wired networks
- D. A wireless router with no other function

Answer: C

Q65. What is the typical range of Bluetooth?

- A. Up to 100 meters
- B. Up to 10 meters
- C. Up to 1 kilometer
- D. Up to 1 meter

Answer: B

Q66. What does SSID stand for in wireless networking?

- A. Secure Service Identification
- B. System Signal ID
- C. Service Set Identifier
- D. Standard Service ID

Answer: C

Q67. Which generation of cellular networks introduced mobile broadband data?

- A. 3G
- B. 1G
- C. 4G
- D. 2G

Answer: A

Q68. What is the hidden station problem in wireless networks?

- A. A station that is invisible on the network map
- B. A station with no assigned IP address
- C. A station using strong encryption protocol
- D. Two stations that cannot hear each other cause collisions

Answer: D

Q69. Which wireless technology is designed for very short-range communication used in contactless payments?

- A. WiMAX standard
- B. Wi-Fi standard
- C. Bluetooth Low Energy
- D. NFC technology

Answer: D

Q70. What type of network does ZigBee create?

- A. Satellite network for remote areas
- B. Wide Area Network for cities
- C. Cellular network for mobiles
- D. Low-power mesh network for IoT

Answer: D

Q71. What is cloud computing?

- A. A type of weather forecasting software tool
- B. On-demand delivery of resources via Internet
- C. Local server-based computing on premises
- D. Computing done using aerial drones

Answer: B

Q72. What does IaaS stand for?

- A. Infrastructure as a Service
- B. Information as a Service
- C. Integration as a Service
- D. Internet as a Service

Answer: A

Q73. Which of the following is an example of SaaS?

- A. Microsoft Azure VMs
- B. Google Gmail
- C. Docker containers
- D. Amazon EC2

Answer: B

Q74. What is a public cloud?

- A. A cloud hosted within company premises
- B. A cloud available to the general public
- C. A cloud with no security measures
- D. A cloud available to government only

Answer: B

Q75. What is the main benefit of cloud computing's pay-as-you-go model?

- A. Fixed monthly cost regardless of usage
- B. Paying only for resources you use
- C. No need for any internet access
- D. Unlimited free resources for everyone

Answer: B

Q76. What does PaaS provide?

- A. A platform for developing and deploying apps
- B. Network cables and hardware equipment
- C. Physical servers for data centers
- D. Pre-built software applications for users

Answer: A

Q77. What is a private cloud?

- A. Cloud infrastructure for a single organization
- B. The same thing as a public cloud
- C. A cloud with no internet connection
- D. A cloud with no active users at all

Answer: A

Q78. Which of the following is a major public cloud provider?

- A. Linux operating system
- B. Amazon Web Services (AWS)
- C. Cisco Routers hardware
- D. Microsoft Office suite

Answer: B

Q79. What is virtualization in cloud computing?

- A. Creating virtual versions of resources
- B. Creating virtual reality environments
- C. A type of encryption algorithm
- D. Making data invisible to users

Answer: A

Q80. What is scalability in cloud computing?

- A. The ability to adjust resources on demand
- B. The ability to weigh resources precisely
- C. The speed of the network connection
- D. The physical size of a data center

Answer: A

Q81. What is a firewall?

- A. A hardware component inside a router
- B. A type of computer virus or malware
- C. A device that monitors and controls traffic
- D. A wall constructed from fire materials

Answer: C

Q82. What does encryption do?

- A. Speeds up data transmission rate
- B. Deletes data from the storage
- C. Converts plaintext into ciphertext
- D. Compresses data to save space

Answer: C

Q83. What is a VPN?

- A. A virtual public network for browsing
- B. A very private network with no encryption
- C. A secure encrypted tunnel over public networks
- D. A virtual protocol network for routing

Answer: C

Q84. What is a DDoS attack?

- A. A type of computer virus infection
- B. A data decryption technique for ciphertext
- C. A routing protocol for network traffic
- D. Overwhelming a target with traffic from many sources

Answer: D

Q85. What is the purpose of an IDS (Intrusion Detection System)?

- A. To detect and alert on suspicious activity
- B. To assign IP addresses to devices
- C. To block all incoming network traffic
- D. To encrypt data during transmission

Answer: A

Q86. What is phishing?

- A. A social engineering attack to steal data
- B. A feature built into firewalls
- C. A network communication protocol
- D. A type of recreational fishing activity

Answer: A

Q87. What does SSL/TLS provide?

- A. Secure encrypted communication
- B. Faster network speeds overall
- C. IP address assignment to hosts
- D. File compression for storage

Answer: A

Q88. What is malware?

- A. A type of firewall software
- B. Malicious software designed to harm
- C. Defective hardware components
- D. A network topology design

Answer: B

Q89. What is the difference between symmetric and asymmetric encryption?

- A. Symmetric encryption is always much stronger
- B. They are the same encryption method
- C. Asymmetric uses a single shared key only
- D. Symmetric uses one key; asymmetric uses a key pair

Answer: D

Q90. What is a digital certificate?

- A. An electronic document binding key to identity
- B. A type of password for user accounts
- C. A printed diploma for graduates
- D. An IP address assigned to a server

Answer: A

Q91. What does IoT stand for?

- A. Internal Operating Terminal
- B. Integration of Technology
- C. Internet of Transactions
- D. Internet of Things

Answer: D

Q92. What is 5G?

- A. Fifth generation of mobile networks
- B. A type of Wi-Fi standard
- C. A network security protocol
- D. A cloud storage service

Answer: A

Q93. What is IPv6 primarily designed to address?

- A. Wireless communication needs
- B. The exhaustion of IPv4 addresses
- C. Better security features only
- D. Faster packet routing speeds

Answer: B

Q94. What is a smart city?

- A. A city with many computer stores
- B. A city with a very high population
- C. A virtual city in a video game
- D. A city using IoT to enhance services

Answer: D

Q95. What is the main advantage of fiber optic networks over copper networks?

- A. Better physical flexibility for bending
- B. Easier installation and maintenance work
- C. Much higher bandwidth and longer distance
- D. Lower cost of installation and materials

Answer: C

Q96. What does SDN stand for?

- A. Standard Digital Network
- B. System Data Node
- C. Secure Data Network
- D. Software-Defined Networking

Answer: D

Q97. What is a sensor network?

- A. A network of human sensor operators
- B. A type of local area network design
- C. Distributed sensor nodes monitoring conditions
- D. A social media network platform

Answer: C

Q98. What is Voice over IP (VoIP)?

- A. A routing protocol for packets
- B. Voice communications delivered over IP networks
- C. A type of network hardware device
- D. A video streaming service platform

Answer: B

Q99. What is network convergence?

- A. Networks colliding with each other
- B. The end of all networking technology
- C. Integrating voice, video, data on one network
- D. A type of router configuration mode

Answer: C

Q100. What is Li-Fi?

- A. A type of local area network
- B. A battery charging technology
- C. A fiber optic cable standard
- D. A technology using light for data transfer

Answer: D

Q101. What does the term 'throughput' measure in data communication?

- A. The maximum cable length allowed
- B. The voltage level of a channel
- C. The actual data transfer rate achieved
- D. The number of errors in a signal

Answer: C

Q102. Which type of cable uses light to transmit data signals?

- A. Coaxial cable
- B. Fiber optic
- C. Twisted pair
- D. Ethernet cable

Answer: B

Q103. What is the function of a modem in data communication?

- A. It compresses files before sending
- B. It connects two LANs wirelessly
- C. It modulates and demodulates signals
- D. It filters spam from email traffic

Answer: C

Q104. Which of the following is an unguided transmission medium?

- A. Twisted pair
- B. Fiber optic
- C. Radio waves
- D. Coaxial cable

Answer: C

Q105. What does 'latency' mean in the context of data communication?

- A. The speed of signal modulation
- B. The delay before data transfer begins
- C. The frequency range of a channel
- D. The size of the data payload sent

Answer: B

Q106. In data communication, what does 'noise' refer to?

- A. A type of data encryption method
- B. Unwanted signals that distort data
- C. The volume of audio transmissions
- D. The speed of packet forwarding

Answer: B

Q107. Which topology connects every device to a central hub?

- A. Ring topology
- B. Mesh topology
- C. Bus topology
- D. Star topology

Answer: D

Q108. What does 'attenuation' mean in signal transmission?

- A. Reflection of signal at endpoints
- B. Loss of signal strength over distance
- C. Increase in signal frequency
- D. Conversion of analog to digital

Answer: B

Q109. What is the role of a repeater in communication?

- A. It encrypts data for security
- B. It assigns IP addresses to hosts
- C. It routes packets between networks
- D. It amplifies and regenerates signals

Answer: D

Q110. Which encoding scheme represents data using two voltage levels?

- A. Unipolar encoding
- B. Analog encoding
- C. Multilevel encoding
- D. Bipolar encoding

Answer: A

Q111. What does LAN stand for in computer networking?

- A. Local Area Network
- B. Linear Array Network
- C. Linked Access Node
- D. Large Area Network

Answer: A

Q112. Which device connects multiple networks and routes packets?

- A. Router
- B. Repeater
- C. Bridge
- D. Hub

Answer: A

Q113. What is the primary function of a network switch?

- A. It forwards frames based on MAC address
- B. It assigns IP addresses to devices
- C. It provides wireless connectivity only
- D. It converts digital signals to analog

Answer: A

Q114. How many layers are in the OSI reference model?

- A. Six
- B. Four
- C. Seven
- D. Five

Answer: C

Q115. Which layer of the OSI model handles end-to-end delivery?

- A. Application layer
- B. Transport layer
- C. Network layer
- D. Session layer

Answer: B

Q116. What type of network covers a large geographic area like a country?

- A. WAN
- B. LAN
- C. PAN
- D. MAN

Answer: A

Q117. Which cable type is commonly used in Ethernet LANs?

- A. Coaxial cable only
- B. Satellite links
- C. Fiber optic only
- D. Twisted pair copper

Answer: D

Q118. What is a MAC address used for in networking?

- A. Identifying a device on the internet globally
- B. Encrypting data during wireless transmission
- C. Assigning a domain name to a web server
- D. Uniquely identifying a device on a local network

Answer: D

Q119. Which OSI layer converts data into a format suitable for transmission?

- A. Transport layer
- B. Application layer
- C. Session layer
- D. Presentation layer

Answer: D

Q120. What does a hub do when it receives a data frame?

- A. It broadcasts the frame to all connected ports
- B. It drops the frame if the destination is unknown
- C. It sends the frame only to the destination port
- D. It stores and forwards based on IP addresses

Answer: A

Q121. What is the primary function of the data link layer?

- A. End-to-end process communication
- B. Formatting data for display
- C. Routing packets across networks
- D. Reliable node-to-node data transfer

Answer: D

Q122. What is a frame in the context of the data link layer?

- A. A network routing table entry
- B. A data unit at the data link layer
- C. A type of physical cable connector
- D. A wireless signal modulation type

Answer: B

Q123. Which sublayer of the data link layer controls access to the shared medium?

- A. Media Access Control
- B. Physical Control
- C. Network Control
- D. Logical Link Control

Answer: A

Q124. What is the purpose of a parity bit in error detection?

- A. It compresses the data payload
- B. It encrypts the frame contents
- C. It determines the routing path used
- D. It detects single-bit transmission errors

Answer: D

Q125. What does CRC stand for in error detection?

- A. Central Routing Control
- B. Carrier Rate Conversion
- C. Cyclic Redundancy Check
- D. Circuit Relay Connection

Answer: C

Q126. Which framing method uses a special flag byte to mark frame boundaries?

- A. Clock encoding
- B. Bit stuffing
- C. Character count
- D. Byte stuffing

Answer: D

Q127. What does the LLC sublayer provide in the data link layer?

- A. Physical signal encoding methods
- B. Flow control and error management
- C. IP address assignment to devices
- D. Wireless frequency band selection

Answer: B

Q128. In Ethernet, what is the standard maximum frame size?

- A. 512 bytes
- B. 2048 bytes
- C. 4096 bytes
- D. 1518 bytes

Answer: D

Q129. What happens when a frame fails an error check at the receiver?

- A. The frame is stored indefinitely for later use
- B. The frame is forwarded to the next router
- C. The frame is typically discarded by receiver
- D. The frame is automatically corrected in place

Answer: C

Q130. Which protocol is a well-known data link layer protocol for point-to-point connections?

- A. FTP
- B. PPP
- C. DNS
- D. TCP

Answer: B

Q131. What is the main function of the network layer?

- A. Routing packets from source to destination
- B. Encrypting data for secure transfer
- C. Establishing physical connections
- D. Managing user application interfaces

Answer: A

Q132. Which protocol is primarily used for logical addressing?

- A. TCP
- B. IP
- C. ARP
- D. UDP

Answer: B

Q133. How many bits are in an IPv4 address?

- A. 48 bits
- B. 32 bits
- C. 16 bits
- D. 64 bits

Answer: B

Q134. What does a subnet mask define in IP networking?

- A. The maximum speed of data transfer
- B. The encryption key for data packets
- C. The network and host portions of an IP
- D. The physical address of a network card

Answer: C

Q135. What is the purpose of a default gateway?

- A. It blocks all unauthorized network traffic
- B. It stores all website data on the network
- C. It assigns IP addresses to local devices
- D. It forwards packets to networks outside the LAN

Answer: D

Q136. Which device operates primarily at the network layer?

- A. Router
- B. Hub
- C. Repeater
- D. Switch

Answer: A

Q137. What does ICMP stand for?

- A. Internet Connected Media Protocol
- B. Internet Control Message Protocol
- C. Internal Cache Management Protocol
- D. Integrated Circuit Module Process

Answer: B

Q138. What is the purpose of the TTL field in an IP packet?

- A. To limit the packet's lifetime in network
- B. To encrypt the packet data payload
- C. To identify the transport layer protocol
- D. To store the destination port number

Answer: A

Q139. What command is commonly used to test network connectivity?

- A. ping
- B. tracert
- C. netstat
- D. ipconfig

Answer: A

Q140. What is the loopback address in IPv4?

- A. 192.168.0.1
- B. 255.255.255.0
- C. 10.0.0.1
- D. 127.0.0.1

Answer: D

Q141. What is the main function of the transport layer?

- A. Routing across networks
- B. Physical signal transmission
- C. Data link error detection
- D. End-to-end communication

Answer: D

Q142. Which transport protocol provides reliable data delivery?

- A. UDP
- B. TCP
- C. ARP
- D. ICMP

Answer: B

Q143. What does UDP stand for in networking?

- A. Universal Direct Process
- B. Unverified Data Pathway
- C. Unified Data Protocol
- D. User Datagram Protocol

Answer: D

Q144. What is a port number used for in the transport layer?

- A. Specifying the data encoding format used
- B. Determining the routing path for packets
- C. Identifying a specific application or process
- D. Identifying the physical cable connection used

Answer: C

Q145. Which well-known port number is used by HTTP?

- A. Port 80
- B. Port 53
- C. Port 21
- D. Port 25

Answer: A

Q146. What is a socket in networking terminology?

- A. A physical cable connector on a device
- B. A combination of IP address and port number
- C. A type of wireless antenna for signals
- D. A protocol for error detection in frames

Answer: B

Q147. What type of service does UDP provide?

- A. Connectionless unreliable delivery
- B. Connection-oriented reliable delivery
- C. Connectionless reliable delivery
- D. Connection-oriented unreliable delivery

Answer: A

Q148. What is segmentation in the transport layer?

- A. Routing packets through different network paths
- B. Dividing data into smaller manageable units
- C. Encrypting data before network transmission
- D. Combining multiple packets into one large block

Answer: B

Q149. Which port number is used by HTTPS?

- A. Port 443
- B. Port 110
- C. Port 8080
- D. Port 143

Answer: A

Q150. Which protocol is preferred for real-time video streaming?

- A. TCP
- B. UDP
- C. FTP
- D. SMTP

Answer: B

Q151. What does DNS stand for in networking?

- A. Direct Network Signal
- B. Digital Node Switch
- C. Data Network Service
- D. Domain Name System

Answer: D

Q152. Which protocol is used to send email?

- A. DNS
- B. HTTP
- C. SMTP
- D. FTP

Answer: C

Q153. What is the primary function of FTP?

- A. Sending email messages
- B. Transferring files between hosts
- C. Browsing web pages online
- D. Resolving domain names

Answer: B

Q154. Which protocol is used to retrieve email from a server?

- A. POP3
- B. SNMP
- C. HTTP
- D. SMTP

Answer: A

Q155. What does HTTP stand for?

- A. HyperText Transfer Protocol
- B. Hyper Terminal Transfer Process
- C. High Throughput Test Platform
- D. Host Transfer Text Protocol

Answer: A

Q156. What is the purpose of the DHCP protocol?

- A. Resolving domain name queries
- B. Transferring files to a server
- C. Assigning IP addresses automatically
- D. Encrypting web page content

Answer: C

Q157. Which application layer protocol is used for remote login?

- A. Telnet
- B. DNS
- C. SMTP
- D. FTP

Answer: A

Q158. What is a URL in the context of the web?

- A. A protocol for securing email traffic
- B. A type of network cable connector
- C. The address used to locate web resources
- D. A device that manages web server load

Answer: C

Q159. What does SNMP stand for?

- A. Standard Network Module Platform
- B. Simple Network Management Protocol
- C. System Network Message Protocol
- D. Secure Node Monitoring Process

Answer: B

Q160. Which protocol provides secure web communication?

- A. HTTP
- B. SMTP
- C. HTTPS
- D. FTP

Answer: C

Q161. What does WiFi stand for?

- A. Wave Finder
- B. Wired Filter
- C. Wide Frequency
- D. Wireless Fidelity

Answer: D

Q162. Which IEEE standard defines wireless LAN technology?

- A. 802.16
- B. 802.11
- C. 802.3
- D. 802.15

Answer: B

Q163. What device provides wireless network access to clients?

- A. Modem
- B. Repeater
- C. Router
- D. Access Point

Answer: D

Q164. Which frequency band is commonly used by WiFi networks?

- A. 900 MHz
- B. 5 MHz
- C. 2.4 GHz
- D. 100 GHz

Answer: C

Q165. What is Bluetooth primarily used for?

- A. Short-range device communication
- B. Long-range internet connectivity
- C. Underwater data transmission
- D. Satellite television broadcast

Answer: A

Q166. What does SSID represent in a wireless network?

- A. The channel frequency used by the router
- B. The MAC address of the access point device
- C. The name that identifies a wireless network
- D. The encryption key for network access

Answer: C

Q167. Which generation of mobile networks introduced mobile broadband?

- A. 3G
- B. 4G
- C. 1G
- D. 2G

Answer: A

Q168. What is the main advantage of wireless networks over wired?

- A. Greater mobility for users
- B. Higher data transfer speeds
- C. Stronger signal over distances
- D. Lower electromagnetic interference

Answer: A

Q169. What type of wireless network has the shortest range?

- A. LAN
- B. WAN
- C. PAN
- D. MAN

Answer: C

Q170. What does NFC stand for in wireless technology?

- A. New Frequency Channel
- B. Network File Control
- C. Near Field Communication
- D. Node Forwarding Cache

Answer: C

Q171. What is cloud computing in simple terms?

- A. Connecting computers using only Bluetooth signals
- B. Building physical servers in an office building
- C. Delivering computing services over the internet
- D. Storing data on local hard drives only

Answer: C

Q172. What does IaaS stand for in cloud computing?

- A. Infrastructure as a Service
- B. Integration as a System
- C. Internet as a Service
- D. Information as a Standard

Answer: A

Q173. Which cloud service model provides ready-to-use software applications?

- A. DaaS
- B. SaaS
- C. PaaS
- D. IaaS

Answer: B

Q174. What is a public cloud?

- A. A cloud that uses only open source software tools
- B. A cloud available only to a single organization
- C. A cloud that stores only public government records
- D. A cloud accessible by any user over the internet

Answer: D

Q175. What is a private cloud?

- A. A social media platform with privacy settings
- B. A cloud that is not connected to any network
- C. A cloud dedicated to a single organization's use
- D. A personal computer connected to the internet

Answer: C

Q176. What is a virtual machine in cloud computing?

- A. A software emulation of a computer system
- B. A networking cable connecting two servers
- C. A type of database management software tool
- D. A physical server in a data center building

Answer: A

Q177. Which company provides the AWS cloud platform?

- A. Microsoft
- B. Amazon
- C. Apple
- D. Google

Answer: B

Q178. What is scalability in cloud computing?

- A. The ability to encrypt all stored data securely
- B. The ability to increase or decrease resources as needed
- C. The process of backing up data to external storage
- D. The speed at which data travels between cloud servers

Answer: B

Q179. What does PaaS provide to developers?

- A. Complete ready-to-use software for end users
- B. Network monitoring and security scanning tools
- C. A platform for building and deploying applications
- D. Only physical hardware servers and cables

Answer: C

Q180. What is a hybrid cloud deployment model?

- A. A cloud that stores data in multiple file formats
- B. A combination of public and private cloud services
- C. A cloud that only runs on mobile phone devices
- D. A cloud that uses only renewable energy sources

Answer: B

Q181. What is the primary purpose of a firewall?

- A. Filtering traffic between networks
- B. Assigning IP addresses to hosts
- C. Compressing data for faster transfer
- D. Increasing network bandwidth speed

Answer: A

Q182. What does encryption do to data?

- A. It increases data transfer speed on network
- B. It routes data through the fastest path
- C. It compresses data to save storage space
- D. It converts data into an unreadable format

Answer: D

Q183. What is a denial-of-service (DoS) attack?

- A. Stealing passwords from a database
- B. Modifying web pages without permission
- C. Flooding a system to make it unavailable
- D. Intercepting emails during transmission

Answer: C

Q184. What is the purpose of an antivirus program?

- A. It manages user login credentials securely
- B. It configures firewall rules automatically
- C. It detects and removes malicious software
- D. It speeds up network data transfers

Answer: C

Q185. What is phishing in cybersecurity?

- A. Installing updates on network equipment
- B. Scanning networks to find open ports
- C. Fraudulent attempts to steal sensitive info
- D. Monitoring bandwidth usage on a network

Answer: C

Q186. What does VPN stand for?

- A. Variable Protocol Number
- B. Visual Processing Node
- C. Virtual Private Network
- D. Verified Public Network

Answer: C

Q187. What is malware?

- A. A type of network cable connector
- B. A protocol for secure email transfer
- C. A tool for monitoring network traffic
- D. Software designed to cause system harm

Answer: D

Q188. What is two-factor authentication (2FA)?

- A. Using two different web browsers for access
- B. Requiring two forms of identity verification
- C. Creating two copies of encrypted file data
- D. Connecting through two separate network paths

Answer: B

Q189. What is the role of a security patch?

- A. It changes the user interface design layout
- B. It increases the software processing speed
- C. It adds new features to the software
- D. It fixes known security vulnerabilities

Answer: D

Q190. What does HTTPS protect against?

- A. Eavesdropping on web communication traffic
- B. Physical theft of computer hardware devices
- C. Power surges that damage server components
- D. Hard drive failures that cause data loss

Answer: A

Q191. What does IoT stand for in modern networking?

- A. Internet of Things
- B. Integrated Online Technology
- C. Internal Operating Terminal
- D. Internet of Transfers

Answer: A

Q192. What is 5G in terms of mobile networks?

- A. A satellite communication protocol for space
- B. The fifth version of WiFi technology
- C. A new type of fiber optic cable standard
- D. The fifth generation of mobile network technology

Answer: D

Q193. What is the purpose of smart home technology?

- A. To connect homes directly to satellite networks
- B. To replace all furniture with electronic versions
- C. To automate and remotely control home devices
- D. To eliminate the need for electricity in homes

Answer: C

Q194. What is a sensor network?

- A. A cable network connecting television channels
- B. A network exclusively for video surveillance only
- C. A network of high-speed gaming computers
- D. A group of sensors that collect and share data

Answer: D

Q195. What is artificial intelligence used for in networks?

- A. Designing the physical layout of data center rooms
- B. Automating network management and threat detection
- C. Manufacturing network hardware in smart factories
- D. Replacing all network cables with wireless signals

Answer: B

Q196. What is a smart city concept?

- A. A city that uses only renewable energy exclusively
- B. A city with no physical stores or shopping malls
- C. A city without any public transportation systems
- D. A city using technology and data to improve services

Answer: D

Q197. What does the term 'bandwidth on demand' mean?

- A. Restricting bandwidth during peak usage time periods
- B. Adjusting bandwidth allocation based on real-time needs
- C. Free unlimited internet for all users forever
- D. Permanently increasing bandwidth for all connections

Answer: B

Q198. What is the role of IPv6 in next-generation networks?

- A. It eliminates the need for routers in all networks
- B. It provides a vastly larger address space for devices
- C. It converts all networks to use satellite connections
- D. It replaces WiFi with a faster wireless technology

Answer: B

Q199. What is telemedicine in the context of networks?

- A. A type of network monitoring software for hospitals
- B. A network used exclusively by telephone companies
- C. Remote healthcare delivery using network technology
- D. A method of diagnosing network connection problems

Answer: C

Q200. What is a digital twin in next-generation technology?

- A. A backup copy of a website on a different server
- B. A virtual replica of a physical object or system
- C. A duplicate email account for security purposes
- D. A second network interface card on a computer

Answer: B

Q201. Which type of data transmission sends data in only one direction at a time?

- A. Multiplex transmission
- B. Half-duplex transmission
- C. Simplex transmission
- D. Full-duplex transmission

Answer: B

Q202. What is the smallest unit of data in digital communication?

- A. A single bit representing 0 or 1
- B. A word consisting of 16 bits
- C. A nibble consisting of 4 bits
- D. A byte consisting of 8 bits

Answer: A

Q203. Which device converts digital signals to analog signals for transmission over telephone lines?

- A. A repeater amplifying weak signals
- B. A router directing network traffic
- C. A modem performing signal conversion
- D. A network switch forwarding frames

Answer: C

Q204. What does the term 'baud rate' measure in data communication?

- A. The total bandwidth of a communication link
- B. The number of bytes transferred per minute
- C. The error rate during data transmission
- D. The number of signal changes per second

Answer: D

Q205. Which transmission medium offers the highest bandwidth capacity?

- A. Coaxial copper cable medium
- B. Twisted pair copper cable
- C. Fiber optic cable medium
- D. Unshielded telephone wire

Answer: C

Q206. What is the purpose of a communication protocol?

- A. To define rules governing data exchange
- B. To manufacture networking equipment
- C. To increase the voltage of signals
- D. To physically connect cables to devices

Answer: A

Q207. What is crosstalk in the context of data communication?

- A. Planned interference for signal testing
- B. A method of increasing data capacity
- C. The process of encoding digital data
- D. Unwanted signal coupling between wires

Answer: D

Q208. In serial data transmission, how are bits sent over the communication channel?

- A. Bits are split across multiple channels
- B. Bits are sent one after another sequentially
- C. Multiple bits are sent simultaneously
- D. Bits are grouped in fixed-size blocks

Answer: B

Q209. What does the term 'propagation delay' refer to in networking?

- A. Time to encrypt and decrypt data packets
- B. Time to convert data between formats
- C. Time to process packets inside a router
- D. Time for a signal to travel from source to destination

Answer: D

Q210. Which signal type uses discrete voltage levels to represent data?

- A. Acoustic signal through air medium
- B. Analog signal with continuous waves
- C. Digital signal with distinct levels
- D. Modulated carrier frequency signal

Answer: C

Q211. What is the primary function of a network interface card (NIC)?

- A. To connect a device to a computer network
- B. To store data temporarily during transfers
- C. To route packets between different networks
- D. To provide wireless power to portable devices

Answer: A

Q212. Which network topology arranges all devices in a circular chain?

- A. Mesh topology with full connections
- B. Bus topology with shared backbone
- C. Star topology with central device
- D. Ring topology with circular connection

Answer: D

Q213. What is a Metropolitan Area Network (MAN)?

- A. A network connecting countries across continents
- B. A network spanning a single room or building floor
- C. A personal network within a few meters range
- D. A network covering a city or large campus area

Answer: D

Q214. What does a gateway do in computer networking?

- A. It stores web pages for faster user access
- B. It connects networks using different protocols
- C. It monitors bandwidth usage on local links
- D. It amplifies signals on a single network

Answer: B

Q215. Which layer of the OSI model is responsible for data formatting and encryption?

- A. The session layer managing connections
- B. The transport layer handling segments
- C. The presentation layer handling format
- D. The application layer for user access

Answer: C

Q216. What is a peer-to-peer (P2P) network model?

- A. A model where each device can act as client and server
- B. A model requiring a central database for all data
- C. A model where one server manages all resources
- D. A model using only wireless communication links

Answer: A

Q217. What does bandwidth refer to in computer networking?

- A. The total storage available on a file server
- B. The maximum data transfer capacity of a link
- C. The number of devices connected to a network
- D. The physical length of a network cable

Answer: B

Q218. What is the client-server model in networking?

- A. A model where data is stored exclusively on client machines
- B. A model where devices share resources equally without hierarchy
- C. A model where clients request services from a dedicated server
- D. A model where only one device is connected at any given time

Answer: C

Q219. What does the physical layer of the OSI model deal with?

- A. Logical addressing and routing decisions
- B. Session establishment between applications
- C. Error detection within transmitted frames
- D. Raw bit transmission over physical media

Answer: D

Q220. What is a network protocol stack?

- A. A layered set of protocols working together
- B. A single protocol handling all network tasks
- C. A hardware component inside every router
- D. A physical rack holding network equipment

Answer: A

Q221. What is the purpose of flow control at the data link layer?

- A. To encrypt data before physical transmission
- B. To prevent the sender from overwhelming the receiver
- C. To route frames between different networks
- D. To assign IP addresses to connected devices

Answer: B

Q222. What is the stop-and-wait protocol in data link communication?

- A. The sender transmits all frames at once before waiting
- B. The receiver stops all incoming traffic when busy
- C. The sender waits for a timer before each transmission
- D. The sender sends one frame and waits for acknowledgment

Answer: D

Q223. What does ARQ stand for in data link layer protocols?

- A. Automatic Repeat reQuest for error recovery
- B. Asynchronous Relay Queue for data buffering
- C. Address Resolution Queue for frame delivery
- D. Adaptive Rate Quantization for bandwidth use

Answer: A

Q224. What is the broadcast MAC address used to reach all devices on a network?

- A. 00:00:00:00:00:00 representing zero address
- B. 01:00:00:00:00:00 representing multicast
- C. FF:FF:FF:FF:FF:FF representing all ones
- D. FE:FE:FE:FE:FE:FE representing link local

Answer: C

Q225. What type of error occurs when a single bit in a frame is changed during transmission?

- A. A burst error affecting multiple bits
- B. A framing error at the boundary mark
- C. A single-bit error in the data frame
- D. A sequence error in the frame order

Answer: C

Q226. What is the purpose of the destination address field in an Ethernet frame?

- A. To identify the intended recipient device
- B. To indicate the protocol type being used
- C. To contain error-checking information data
- D. To specify the sender's network location

Answer: A

Q227. What is the role of acknowledgment frames in reliable data delivery?

- A. They establish the initial connection setup
- B. They confirm successful receipt of data frames
- C. They carry user data from sender to receiver
- D. They request retransmission of all sent frames

Answer: B

Q228. What is a collision in the context of Ethernet networks?

- A. When a cable is physically disconnected from a port
- B. When a device sends data to an unknown MAC address
- C. When a frame exceeds the maximum allowed frame size
- D. When two devices transmit data simultaneously on shared media

Answer: D

Q229. What is the function of the type/length field in an Ethernet frame?

- A. It contains the frame check sequence value
- B. It indicates the protocol or payload length
- C. It stores the MAC address of the next hop
- D. It specifies the transmission speed to use

Answer: B

Q230. What does the term 'full-duplex Ethernet' mean?

- A. Data can only flow in one direction at a time
- B. Data is transmitted at double the normal speed
- C. Data can flow in both directions simultaneously
- D. Data is duplicated across two separate cables

Answer: C

Q231. What is the purpose of an IP address in networking?

- A. To specify the application protocol being used
- B. To logically identify a device on a network
- C. To determine the cable type connecting devices
- D. To identify the physical hardware of a device

Answer: B

Q232. What is the difference between a public and a private IP address?

- A. Public addresses are assigned by DHCP while private addresses are manually configured
- B. Private addresses use IPv6 while public addresses always use IPv4 format
- C. Private addresses are used within local networks while public addresses are on the internet
- D. Public addresses are used on local networks while private addresses are on the internet

Answer: C

Q233. What is the default subnet mask for a Class A IPv4 address?

- A. 255.255.255.0 with 24 network bits
- B. 255.255.255.128 with 25 network bits
- C. 255.0.0.0 with 8 network bits only
- D. 255.255.0.0 with 16 network bits

Answer: C

Q234. What is a routing table used for in a router?

- A. To determine the best path for forwarding packets
- B. To filter web content based on user preferences
- C. To encrypt all outgoing traffic at the gateway
- D. To store the physical locations of all devices

Answer: A

Q235. Which class of IPv4 addresses has a first octet range of 128 to 191?

- A. Class D addresses for multicast groups
- B. Class C addresses for small networks
- C. Class A addresses for large networks
- D. Class B addresses for medium networks

Answer: D

Q236. What is static routing in a network?

- A. Routes change dynamically based on current traffic load
- B. Routes are manually configured by a network administrator
- C. Routes are computed using the shortest path algorithm
- D. Routes are automatically learned from neighboring routers

Answer: B

Q237. What does the traceroute (tracert) command show?

- A. The MAC addresses of all devices on a local network
- B. The list of open ports on a destination host
- C. The bandwidth available on each network interface
- D. The path packets take through routers to a destination

Answer: D

Q238. What is an IPv4 header's minimum size in bytes?

- A. 20 bytes without any option fields
- B. 32 bytes without any option fields
- C. 10 bytes without any option fields
- D. 40 bytes without any option fields

Answer: A

Q239. What type of routing protocol learns routes automatically from other routers?

- A. Direct routing for locally connected subnets
- B. Default routing using a single gateway path
- C. Dynamic routing using protocol exchanges
- D. Static routing configured manually by admin

Answer: C

Q240. What is the purpose of the network layer's fragmentation mechanism?

- A. To combine small packets into larger ones for efficiency
- B. To split packets that exceed a link's maximum transfer unit
- C. To compress large packets for faster transmission speed
- D. To encrypt packet contents for secure delivery to hosts

Answer: B

Q241. What is the primary difference between TCP and UDP?

- A. TCP provides reliable delivery while UDP is connectionless
- B. TCP works only on wired networks while UDP works wirelessly
- C. TCP is faster while UDP provides guaranteed delivery
- D. UDP uses larger packets while TCP uses smaller packets

Answer: A

Q242. What is a well-known port number?

- A. A port used exclusively by operating system processes
- B. A dynamically assigned port used for temporary connections
- C. A port in the range 0-1023 reserved for standard services
- D. Any port above 49151 used by client applications

Answer: C

Q243. Which port number does DNS typically use?

- A. Port 23 for domain name queries
- B. Port 53 for domain name queries
- C. Port 67 for domain name queries
- D. Port 110 for domain name queries

Answer: B

Q244. What is multiplexing at the transport layer?

- A. Converting data formats between different application types
- B. Splitting a single application across multiple networks
- C. Encrypting traffic from a single application for security
- D. Combining data from multiple applications for transmission

Answer: D

Q245. What flag is used in the TCP handshake to initiate a connection?

- A. The ACK flag for acknowledgment setup
- B. The SYN flag for synchronization request
- C. The FIN flag for connection finalization
- D. The RST flag for connection reset action

Answer: B

Q246. What application layer service typically uses TCP port 25?

- A. Email sending using SMTP protocol
- B. Secure shell remote login to servers
- C. Web browsing using HTTP protocol
- D. File transfer using FTP data channel

Answer: A

Q247. What is the purpose of sequence numbers in TCP?

- A. To measure the round-trip time for each packet
- B. To encrypt the data payload of each segment
- C. To identify the source application on the host
- D. To track the order of transmitted data bytes

Answer: D

Q248. Why is UDP preferred for live video streaming applications?

- A. UDP guarantees all video frames arrive in order
- B. UDP provides better encryption for video content
- C. UDP has lower overhead and tolerates some data loss
- D. UDP supports larger maximum packet sizes than TCP

Answer: C

Q249. What is demultiplexing at the transport layer?

- A. Converting between different transport protocols dynamically
- B. Combining data from many applications into one stream
- C. Delivering received data to the correct application via port numbers
- D. Splitting data across multiple network paths for speed

Answer: C

Q250. What is an ephemeral port in networking?

- A. A port used exclusively for encrypted communication
- B. A permanently assigned port for a specific service
- C. A reserved port used only by system administrators
- D. A temporary port assigned to a client for a session

Answer: D

Q251. What is a web browser used for in networking?

- A. To monitor bandwidth usage across all links
- B. To access and display web pages from servers
- C. To manage database records on the network
- D. To configure router settings and interfaces

Answer: B

Q252. What port does POP3 use for email retrieval?

- A. Port 143 for email message retrieval
- B. Port 993 for email message retrieval
- C. Port 25 for email message retrieval
- D. Port 110 for email message retrieval

Answer: D

Q253. What is the purpose of TFTP (Trivial File Transfer Protocol)?

- A. To securely transfer files using encrypted communication channels
- B. To transfer large files with error correction and authentication
- C. To provide simple file transfers without authentication features
- D. To synchronize file versions across distributed storage systems

Answer: C

Q254. What does a DNS A record store?

- A. The IPv4 address mapped to a domain name
- B. The alias or canonical name for a domain
- C. The mail server address for the domain
- D. The authoritative nameserver for the domain

Answer: A

Q255. What is the role of an email client application?

- A. It routes email traffic between different mail servers
- B. It converts email protocols from SMTP to HTTP format
- C. It filters spam at the server before delivery to users
- D. It allows users to compose, send, and read email messages

Answer: D

Q256. What does the HTTP GET method request from a server?

- A. It requests to create a new resource on the server
- B. It requests to retrieve a resource from the server
- C. It requests to update an existing resource on server
- D. It requests to delete a resource from the server

Answer: B

Q257. What is IMAP used for in email communication?

- A. Accessing and managing email directly on the server
- B. Sending email messages between mail servers
- C. Filtering incoming email for spam and viruses
- D. Encrypting email content during transmission

Answer: A

Q258. What type of DNS record is used for email routing?

- A. A PTR record for reverse DNS mail lookups
- B. An A record pointing to the mail server IP
- C. A CNAME record aliasing the mail server name
- D. An MX record specifying the mail exchange server

Answer: D

Q259. What does NTP (Network Time Protocol) do?

- A. It transfers files between networked computers
- B. It translates network addresses between formats
- C. It synchronizes clocks across networked devices
- D. It monitors network traffic for security threats

Answer: C

Q260. What is the function of a proxy server?

- A. It assigns MAC addresses to new network devices
- B. It acts as an intermediary between clients and servers
- C. It generates encryption keys for secure connections
- D. It directly connects two LANs using physical cables

Answer: B

Q261. What is the purpose of a wireless router in a home network?

- A. To replace the ISP's connection to the internet
- B. To provide wireless and wired connectivity to the internet
- C. To boost cellular signal strength in buildings
- D. To connect only wired devices to the internet

Answer: B

Q262. What is the 5 GHz frequency band used for in WiFi?

- A. It provides higher data speeds with shorter range
- B. It is used only for outdoor wireless deployments
- C. It is reserved exclusively for Bluetooth devices
- D. It provides longer range but lower data speeds

Answer: A

Q263. What does WPA stand for in wireless security?

- A. Wide Protocol Authentication mechanism
- B. Wireless Protected Architecture standard
- C. Wireless Packet Authorization framework
- D. Wi-Fi Protected Access security protocol

Answer: D

Q264. What is a wireless hotspot?

- A. An area where wireless signal is intentionally blocked
- B. A tool for testing wireless network security
- C. A location providing public wireless internet access
- D. A device that measures wireless signal strength

Answer: C

Q265. What is the main purpose of WEP encryption in wireless networks?

- A. To assign IP addresses to wireless client devices
- B. To increase the speed of wireless data transfer
- C. To manage handoff between wireless access points
- D. To provide basic encryption for wireless communication

Answer: D

Q266. Which generation of mobile networks is primarily known for voice calls?

- A. 4G networks with LTE high-speed service
- B. 2G networks with digital voice capability
- C. 5G networks with ultra-low latency service
- D. 3G networks with mobile broadband data

Answer: B

Q267. What is a wireless repeater (range extender) used for?

- A. To extend the coverage area of an existing wireless network
- B. To secure the wireless network against unauthorized access
- C. To create a new wireless network with different settings
- D. To reduce interference between neighboring wireless networks

Answer: A

Q268. What does the term 'wireless channel' refer to in WiFi?

- A. The cable connecting an access point to a switch
- B. The physical antenna used to transmit signals
- C. A specific frequency range for wireless communication
- D. The security encryption method used by the router

Answer: C

Q269. What type of wireless network does IoT typically use for low-power devices?

- A. Standard WiFi 6 enterprise access points
- B. High-speed 5G millimeter wave connections
- C. Low-power wide-area networks like LoRaWAN
- D. Satellite-based global broadband connections

Answer: C

Q270. What is the role of an antenna in wireless communication?

- A. It encrypts the wireless signal for security
- B. It stores data while waiting for transmission slots
- C. It assigns channels to different wireless clients
- D. It converts electrical signals to radio waves and vice versa

Answer: D

Q271. What is a cloud data center?

- A. A personal computer storing data at home
- B. A facility housing cloud computing resources and servers
- C. A local hard drive connected to a network
- D. A mobile application for storing contacts

Answer: B

Q272. What is an example of Infrastructure as a Service (IaaS)?

- A. Amazon EC2 providing virtual server instances
- B. Google Docs for document editing online
- C. Salesforce for customer relationship management
- D. Microsoft Office 365 for productivity suite

Answer: A

Q273. What is cloud storage?

- A. Data backed up on a local external hard drive
- B. Data stored on remote servers accessed via the internet
- C. Data stored on physical USB drives in an office
- D. Data cached temporarily in a web browser's memory

Answer: B

Q274. What does the term 'on-demand' mean in cloud computing?

- A. Resources must be ordered weeks before they are needed
- B. Resources are shared equally among all users at all times
- C. Resources are available immediately when users need them
- D. Resources are allocated permanently to a single customer

Answer: C

Q275. What is Microsoft Azure?

- A. A cloud computing platform providing various cloud services
- B. A desktop operating system for personal computers
- C. A programming language for web application development
- D. A database management software for local installations

Answer: A

Q276. What is the main advantage of elasticity in cloud computing?

- A. It provides permanent storage that never changes size
- B. It eliminates the need for any internet connectivity
- C. It restricts user access to fixed resource allocations
- D. It automatically adjusts resources based on current demand

Answer: D

Q277. What is Google Cloud Platform (GCP)?

- A. A web browser developed by Google for internet access
- B. A cloud computing service suite offered by Google
- C. A mobile operating system developed by Google team
- D. A social media platform operated by Google company

Answer: B

Q278. What is multi-cloud computing?

- A. Using cloud services from two or more cloud providers
- B. Storing multiple copies of data in one cloud storage bucket
- C. Running multiple applications on one cloud virtual machine
- D. Using multiple data centers from a single cloud provider

Answer: A

Q279. What is a community cloud deployment model?

- A. A cloud shared by the general public without restrictions
- B. A cloud owned and operated by a single private company
- C. A cloud used exclusively by government defense agencies
- D. A cloud shared by organizations with common requirements

Answer: D

Q280. What is a cloud API?

- A. A monitoring tool for tracking cloud resource utilization
- B. A security certificate used to access cloud dashboards
- C. An interface allowing applications to interact with cloud services
- D. A physical connector between cloud data center servers

Answer: C

Q281. What is a strong password policy?

- A. Rules requiring complex, lengthy, and unique passwords
- B. Sharing passwords among trusted team members
- C. Using short passwords for easy memorization
- D. Changing passwords only when a breach is detected

Answer: A

Q282. What is social engineering in the context of cybersecurity?

- A. Building social media platforms for secure communication
- B. Manipulating people into revealing confidential information
- C. Designing network architectures for social media companies
- D. Programming chatbots for automated customer support

Answer: B

Q283. What is the purpose of a security audit?

- A. To install new software on all company computers
- B. To permanently block all external network connections
- C. To increase the bandwidth of the network infrastructure
- D. To evaluate and assess the security posture of a system

Answer: D

Q284. What does the term 'ransomware' refer to?

- A. A tool for managing network access control lists
- B. Software that speeds up your computer's performance
- C. Malware that encrypts data and demands payment for the key
- D. A backup solution that stores copies of important files

Answer: C

Q285. What is the function of an access control list (ACL) on a network device?

- A. It manages the allocation of IP addresses on the local network
- B. It lists all users who have physical access to the server room
- C. It records all login attempts to the network administration panel
- D. It defines rules to permit or deny network traffic on interfaces

Answer: D

Q286. What is a brute force attack?

- A. Systematically trying all possible passwords until finding the correct one
- B. Physically breaking into a data center facility
- C. Flooding a server with traffic to cause denial of service
- D. Intercepting network traffic between two communicating devices

Answer: A

Q287. What is the purpose of network monitoring in security?

- A. To replace firewalls with a more modern security solution
- B. To detect suspicious activities and potential security threats
- C. To increase the speed of all network connections
- D. To permanently store all data passing through the network

Answer: B

Q288. What is a security vulnerability?

- A. A planned feature in software for administrator access
- B. A strength in the system's defense against cyber threats
- C. A weakness that can be exploited to compromise security
- D. A configuration setting that improves network performance

Answer: C

Q289. What is the role of a certificate authority (CA)?

- A. To manage physical access to data center facilities
- B. To issue and verify digital certificates for entities
- C. To monitor network traffic for security threats
- D. To create firewall rules for network perimeter defense

Answer: B

Q290. What does the term 'authentication' mean in network security?

- A. The process of verifying the identity of a user or device
- B. The process of compressing data for faster transmission
- C. The process of routing packets through the fastest path
- D. The process of encrypting data before sending it

Answer: A

Q291. What is an autonomous vehicle in the context of next-generation networks?

- A. A server that operates independently without network connectivity
- B. A self-driving vehicle that relies on network communication for operation
- C. A drone used to deploy networking cables in remote locations
- D. A robotic system that manufactures network equipment automatically

Answer: B

Q292. What is augmented reality (AR) in the context of network applications?

- A. A technique that replaces the real world with a virtual environment
- B. A server architecture used for rendering cloud-based video games
- C. A network protocol designed for transferring 3D model data files
- D. A technology that overlays digital information onto the real world view

Answer: D

Q293. What is the concept of smart grid in next-generation networking?

- A. An intelligent electrical grid that uses network communication for management
- B. A high-performance computing grid for scientific research
- C. A display technology for showing network monitoring dashboards
- D. A network topology where all devices are arranged in a grid pattern

Answer: A

Q294. What is the Internet of Everything (IoE)?

- A. A faster version of the internet with unlimited bandwidth
- B. An extension of IoT connecting people, processes, data, and things
- C. A government initiative to provide internet access everywhere
- D. A protocol for connecting every device using IPv6 addresses

Answer: B

Q295. What is the purpose of wearable technology in next-generation networks?

- A. To replace desktop computers for all computing tasks
- B. To install network equipment without using any tools
- C. To protect network cables from environmental damage
- D. To provide personal health, fitness, and connectivity on the body

Answer: D

Q296. What is Industry 4.0 in the context of next-generation networks?

- A. The fourth major update to enterprise networking equipment
- B. The fourth version of the internet protocol standard
- C. The fourth industrial revolution driven by smart manufacturing and IoT
- D. The fourth generation of mobile wireless communication systems

Answer: C

Q297. What is a drone network in next-generation communication?

- A. A mesh network connecting satellites in geostationary orbit
- B. Unmanned aerial vehicles providing aerial communication coverage
- C. A network of underground cables for secure data transmission
- D. A cluster of servers processing drone surveillance video footage

Answer: B

Q298. What is the concept of connected healthcare?

- A. A social media platform for healthcare professionals to connect
- B. A VPN service designed specifically for medical record access
- C. Using networked devices and systems to improve healthcare delivery
- D. Connecting hospital buildings with high-speed fiber optic cables

Answer: C

Q299. What is a satellite internet constellation?

- A. A group of ground-based antennas pointed at a single satellite
- B. A star topology network named after celestial patterns
- C. A server cluster designed to process astronomical research data
- D. A large fleet of satellites providing global internet coverage

Answer: D

Q300. What is the role of 5G in enabling the Internet of Things?

- A. 5G provides high capacity, low latency, and massive device connectivity for IoT
- B. 5G eliminates the need for any IoT gateway or edge devices
- C. 5G is used only for smartphone communications not IoT devices
- D. 5G replaces WiFi entirely for all IoT device connections

Answer: A

Medium Questions

300 questions

Q301. According to the Nyquist theorem, the maximum data rate of a noiseless channel with bandwidth B and L signal levels is:

- A. $2B \log_2(L)$
- B. $2B / \log_2(L)$
- C. $B \log_2(L)$
- D. $B^2 \log_2(L)$

Answer: A

Q302. What is the Shannon capacity formula for a noisy channel?

- A. $C = B * SNR$
- B. $C = B \log_2(1 + SNR)$
- C. $C = 2B \log_2(SNR)$
- D. $C = B / \log_2(SNR)$

Answer: B

Q303. Which multiplexing technique divides the bandwidth of a link into frequency bands?

- A. CDM
- B. FDM
- C. TDM
- D. WDM

Answer: B

Q304. In PCM (Pulse Code Modulation), what are the three steps in order?

- A. Encoding, Sampling, Quantization
- B. Quantization, Sampling, Encoding
- C. Sampling, Quantization, Encoding
- D. Sampling, Encoding, Quantization

Answer: C

Q305. What type of encoding uses the transition at the middle of a bit interval to represent data?

- A. Unipolar encoding
- B. Manchester encoding
- C. NRZ-I encoding
- D. NRZ-L encoding

Answer: B

Q306. If a signal-to-noise ratio (SNR) is 1000, what is the SNR in decibels?

- A. 20 dB
- B. 30 dB
- C. 10 dB
- D. 40 dB

Answer: B

Q307. Which type of transmission sends bits one at a time over a single channel?

- A. Serial transmission
- B. Parallel transmission
- C. Synchronous transmission
- D. Isochronous transmission

Answer: A

Q308. In asynchronous serial transmission, what is the purpose of start and stop bits?

- A. Compressing the data being sent
- B. Detecting transmission errors in data
- C. Encrypting the transmitted payload
- D. Synchronizing sender and receiver clocks

Answer: D

Q309. Wavelength Division Multiplexing (WDM) is conceptually similar to which multiplexing technique?

- A. TDM
- B. FDM
- C. CDM
- D. STDM

Answer: B

Q310. What is throughput in data communication?

- A. The delay in delivering packets
- B. Number of bits in each signal
- C. Maximum capacity of a channel
- D. Actual data rate through a point

Answer: D

Q311. In a full mesh topology with n devices, how many links are required?

- A. n
- B. n-1
- C. $n(n-1)/2$
- D. n^2

Answer: C

Q312. Which layer of the OSI model handles data encryption and compression?

- A. Presentation layer
- B. Application layer
- C. Session layer
- D. Transport layer

Answer: A

Q313. What is the main advantage of packet switching over circuit switching?

- A. It has simpler implementation
- B. It uses network resources efficiently
- C. It guarantees fixed bandwidth
- D. It provides much lower latency

Answer: B

Q314. Which TCP/IP layer corresponds to the OSI network layer?

- A. Network access layer
- B. Internet layer
- C. Application layer
- D. Transport layer

Answer: B

Q315. What type of switching does ATM (Asynchronous Transfer Mode) use?

- A. Message switching
- B. Cell switching
- C. Packet switching
- D. Circuit switching

Answer: B

Q316. Which organization is responsible for defining the Ethernet standard (IEEE 802.3)?

- A. W3C
- B. IETF
- C. IEEE
- D. ITU

Answer: C

Q317. What is the function of the session layer in the OSI model?

- A. Detecting errors in frames
- B. Encrypting transmitted data
- C. Managing dialog between systems
- D. Routing packets across networks

Answer: C

Q318. In packet switching, what is the difference between datagram and virtual circuit approaches?

- A. Datagrams always use fixed-size data packets
- B. Virtual circuits do not include packet headers
- C. Virtual circuits set up a path first; datagrams do not
- D. Datagrams offer lower latency than virtual circuits

Answer: C

Q319. A hub operates at which layer of the OSI model?

- A. Network layer
- B. Transport layer
- C. Data link layer
- D. Physical layer

Answer: D

Q320. What is the difference between a bridge and a switch?

- A. Bridges forward packets faster than switches do
- B. Bridges work at Layer 3; switches work at Layer 2
- C. There is no functional difference between them
- D. Switches handle multiple frames at once; bridges process one

Answer: D

Q321. What is the purpose of bit stuffing in HDLC?

- A. To prevent the flag pattern in data
- B. To compress the transmitted data
- C. To encrypt the frame contents
- D. To increase available bandwidth

Answer: A

Q322. In the Go-Back-N ARQ protocol, what happens when an error is detected in frame n?

- A. The entire connection is terminated
- B. Only frame n is retransmitted alone
- C. All frames from n onward are resent
- D. Frame n is skipped and ignored

Answer: C

Q323. What is the window size at the receiver in the Go-Back-N protocol?

- A. Same as sender window size
- B. Equal to N minus 1
- C. Always exactly 1 only
- D. Equal to $2^{(m-1)}$

Answer: C

Q324. In Selective Repeat ARQ, what is the maximum window size if the sequence number has m bits?

- A. $2^{(m-1)}$
- B. 2^m
- C. $2^m - 1$
- D. $2^m + 1$

Answer: A

Q325. What is the purpose of the LLC sublayer?

- A. Collision detection on the wire
- B. Signal encoding and modulation
- C. Physical addressing of devices
- D. Flow and error control for frames

Answer: D

Q326. What is the minimum frame size in standard Ethernet (IEEE 802.3)?

- A. 64 bytes
- B. 46 bytes
- C. 32 bytes
- D. 128 bytes

Answer: A

Q327. Which access method does IEEE 802.11 (Wi-Fi) use?

- A. CSMA/CD method
- B. Token passing
- C. CSMA/CA method
- D. FDMA technique

Answer: C

Q328. In the Hamming code, how many redundancy bits are needed for a 4-bit data word?

- A. 3
- B. 2
- C. 5
- D. 4

Answer: A

Q329. What is a VLAN (Virtual LAN)?

- A. A logical group of devices on a network
- B. A wireless LAN using access points
- C. A LAN without any switch devices
- D. A LAN that uses virtual machine hosts

Answer: A

Q330. What is the exponential backoff algorithm used for in Ethernet?

- A. Increasing the link bandwidth
- B. Performing error correction tasks
- C. Determining wait time after collision
- D. Assigning MAC addresses to NICs

Answer: C

Q331. In CIDR notation, what does /28 mean?

- A. 28 hosts are available on subnet
- B. 28 bits are for network addressing
- C. 28 bits are for host addressing
- D. 28 subnets exist in the network

Answer: B

Q332. How many usable host addresses are available in a /26 subnet?

- A. 64
- B. 30
- C. 62
- D. 126

Answer: C

Q333. Which routing protocol uses the Bellman-Ford algorithm?

- A. RIP
- B. OSPF
- C. BGP
- D. IS-IS

Answer: A

Q334. What is the maximum hop count in RIP?

- A. 255
- B. 16
- C. 15
- D. 8

Answer: C

Q335. OSPF is classified as which type of routing protocol?

- A. Path vector
- B. Link-state
- C. Distance vector
- D. Hybrid

Answer: B

Q336. What is the size of an IPv6 address?

- A. 64 bits
- B. 32 bits
- C. 128 bits
- D. 96 bits

Answer: C

Q337. What is the count-to-infinity problem associated with?

- A. Link-state protocols
- B. Distance vector protocols
- C. Static routing tables
- D. Path vector protocols

Answer: B

Q338. Which field in the IPv4 header is used for fragmentation reassembly?

- A. Header checksum field
- B. Identification field
- C. Protocol field
- D. TTL field

Answer: B

Q339. What does DHCP provide?

- A. Automatic IP address assignment
- B. Email delivery management
- C. Routing information exchange
- D. Domain name resolution services

Answer: A

Q340. Which protocol is used between autonomous systems on the Internet?

- A. RIP
- B. EIGRP
- C. BGP
- D. OSPF

Answer: C

Q341. In TCP, what is the purpose of the window size field?

- A. Controlling flow by advertising buffer space
- B. Specifying the maximum segment size used
- C. Detecting errors in transmitted segments
- D. Identifying the application layer protocol

Answer: A

Q342. What is the TCP mechanism for handling out-of-order segments?

- A. Buffering them indefinitely in memory
- B. Requesting retransmission of all data
- C. Discarding all out-of-order segments
- D. Using sequence numbers to reorder them

Answer: D

Q343. What is the purpose of the TCP FIN flag?

- A. To synchronize the sequence numbers
- B. To establish a new connection
- C. To reset an existing connection
- D. To gracefully terminate a connection

Answer: D

Q344. How many steps are involved in graceful TCP connection termination?

- A. 5
- B. 2
- C. 4
- D. 3

Answer: C

Q345. What is Nagle's algorithm in TCP?

- A. A routing algorithm for IP packets
- B. A congestion control mechanism for TCP
- C. An algorithm that buffers small segments
- D. An error correction algorithm for data

Answer: C

Q346. What is the difference between TCP's flow control and congestion control?

- A. Congestion control is faster than flow control always
- B. Flow control is used in UDP; congestion control is for TCP
- C. Flow control protects receiver; congestion control protects network
- D. They are the same mechanism in TCP

Answer: C

Q347. What port number does HTTPS use?

- A. 143
- B. 443
- C. 80
- D. 993

Answer: B

Q348. What is the maximum size of a TCP segment's data payload if the MSS is 1460 bytes?

- A. 65535 bytes
- B. 1500 bytes
- C. 536 bytes
- D. 1460 bytes

Answer: D

Q349. What is the size of the UDP header?

- A. 12 bytes
- B. 4 bytes
- C. 20 bytes
- D. 8 bytes

Answer: D

Q350. In TCP, what does a RST (Reset) flag indicate?

- A. Acknowledgment of data received
- B. Normal graceful termination
- C. An abrupt connection abort
- D. A request to synchronize

Answer: C

Q351. What is the difference between HTTP/1.1 persistent and non-persistent connections?

- A. Persistent connections use UDP instead of TCP
- B. Persistent keeps TCP open for multiple requests; non-persistent does not
- C. There is no difference between them at all
- D. Non-persistent connections are faster than persistent ones

Answer: B

Q352. What type of DNS record maps a domain name to an IPv4 address?

- A. AAAA record
- B. A record
- C. MX record
- D. CNAME record

Answer: B

Q353. What is the difference between FTP active and passive modes?

- A. Active mode uses TCP; passive mode uses UDP for transfer
- B. Active mode is encrypted; passive mode is not encrypted
- C. There is no functional difference between the two modes
- D. In active mode server initiates data; in passive mode client does

Answer: D

Q354. What HTTP status code indicates 'Not Found'?

- A. 403
- B. 200
- C. 301
- D. 404

Answer: D

Q355. What is the purpose of DNS caching?

- A. To create backup DNS server entries
- B. To block malicious domain name requests
- C. To encrypt DNS queries for privacy
- D. To store resolved names for faster lookups

Answer: D

Q356. Which protocol is used for secure file transfer?

- A. Telnet
- B. HTTP
- C. SFTP
- D. FTP

Answer: C

Q357. What is SNMP used for?

- A. Transferring files
- B. Browsing web pages
- C. Sending emails to users
- D. Managing network devices

Answer: D

Q358. In HTTP, what is the difference between GET and POST methods?

- A. GET is more secure than POST method
- B. GET retrieves data via URL; POST sends data in body
- C. POST is always faster than GET requests
- D. They are identical in every respect

Answer: B

Q359. What is a MIME type used for in email?

- A. Filtering out spam messages
- B. Routing emails between servers
- C. Defining the content type format
- D. Encrypting email messages

Answer: C

Q360. What port does SMTP use?

- A. 110
- B. 21
- C. 25
- D. 80

Answer: C

Q361. Why does Wi-Fi use CSMA/CA instead of CSMA/CD?

- A. Collision detection is impractical in wireless
- B. CSMA/CA uses significantly less power
- C. CSMA/CD is not defined for any wireless
- D. CSMA/CA provides faster throughput overall

Answer: A

Q362. What is the purpose of RTS/CTS mechanism in IEEE 802.11?

- A. To increase the available bandwidth
- B. To solve the hidden station problem
- C. To assign IP addresses to clients
- D. To encrypt the transmitted data frames

Answer: B

Q363. What frequency bands does IEEE 802.11n (Wi-Fi 4) support?

- A. 60 GHz band only
- B. Both 2.4 and 5 GHz
- C. 2.4 GHz band only
- D. 5 GHz band only

Answer: B

Q364. What technology does 4G LTE use for its air interface?

- A. FDMA
- B. OFDMA
- C. TDMA
- D. CDMA

Answer: B

Q365. What is MIMO in wireless networking?

- A. A type of signal modulation used
- B. Multiple antennas to boost throughput
- C. A wireless security protocol standard
- D. A specific radio frequency band

Answer: B

Q366. What is the difference between infrastructure mode and ad-hoc mode in Wi-Fi?

- A. They are the same wireless mode
- B. Ad-hoc mode requires an access point to function
- C. Infrastructure mode is slower than ad-hoc mode
- D. Infrastructure uses an AP; ad-hoc is direct device-to-device

Answer: D

Q367. What is handoff (handover) in cellular networks?

- A. Changing the phone number on a SIM
- B. Turning off the mobile phone device
- C. Transferring a call between cell towers
- D. Connecting a device to a Wi-Fi network

Answer: C

Q368. What is the maximum theoretical speed of IEEE 802.11ac (Wi-Fi 5)?

- A. 9.6 Gbps
- B. 1.3 Gbps
- C. 600 Mbps
- D. 6.9 Gbps

Answer: D

Q369. What does WPA3 improve over WPA2?

- A. Faster wireless data speeds overall
- B. Stronger encryption and resistance to dictionary attacks
- C. Greater wireless signal range coverage
- D. Improved battery life for all devices

Answer: B

Q370. What is frequency reuse in cellular networks?

- A. Assigning same frequencies to non-adjacent cells
- B. Changing frequencies every few seconds
- C. Using only one frequency for all traffic
- D. Using the same frequency in every cell

Answer: A

Q371. What is a hybrid cloud?

- A. A cloud running both Windows and Linux
- B. A mix of public and private clouds together
- C. A cloud without any virtualization layer
- D. A cloud powered by solar energy only

Answer: B

Q372. What is the difference between horizontal and vertical scaling?

- A. Vertical scaling is always the better choice
- B. They are the same scaling approach
- C. Horizontal adds machines; vertical adds power
- D. Horizontal scaling is slower than vertical

Answer: C

Q373. What is a hypervisor?

- A. A network communication protocol
- B. Software that creates and runs VMs
- C. A type of network firewall
- D. A cloud storage service platform

Answer: B

Q374. What is serverless computing?

- A. A model where providers manage servers for you
- B. A type of dedicated hardware platform
- C. Computing without any servers at all
- D. Computing without needing Internet access

Answer: A

Q375. What is the difference between a container and a virtual machine?

- A. Containers share the OS kernel; VMs include full OS
- B. Containers require a hypervisor to operate
- C. They are the same technology in practice
- D. VMs are lighter weight than containers are

Answer: A

Q376. What is multi-tenancy in cloud computing?

- A. Running multiple operating systems at once
- B. Using multiple different cloud providers
- C. Multiple customers sharing the same resources
- D. Having multiple data center locations

Answer: C

Q377. What is an SLA in cloud computing?

- A. A server location address identifier
- B. A software license agreement for vendors
- C. A system load analyzer monitoring tool
- D. A contract defining service quality guarantees

Answer: D

Q378. What is cloud migration?

- A. Moving workloads from on-premises to cloud
- B. Deleting cloud resources permanently
- C. Moving birds through cloud formations
- D. Changing between different cloud providers

Answer: A

Q379. What is object storage in cloud computing?

- A. Storing physical objects in warehouses
- B. A traditional relational database type
- C. Managing data as objects with metadata
- D. RAM-based temporary data storage

Answer: C

Q380. What is auto-scaling in cloud computing?

- A. Permanently reducing allocated resources
- B. Manual scaling done by administrators
- C. Automatically adjusting resources with demand
- D. Scaling only during business hours

Answer: C

Q381. What is the difference between IDS and IPS?

- A. IPS only detects without blocking
- B. IDS actively blocks all traffic
- C. They are identical in function
- D. IDS only alerts; IPS also blocks threats

Answer: D

Q382. What is a man-in-the-middle (MITM) attack?

- A. A brute force password cracking attack
- B. A type of network firewall configuration
- C. An attacker intercepting communication between parties
- D. A physical attack on network cables

Answer: C

Q383. What is ARP spoofing?

- A. Repairing corrupted ARP table entries
- B. A DNS poisoning attack on resolvers
- C. A routing protocol attack on BGP routers
- D. Sending fake ARPs to link attacker MAC to valid IP

Answer: D

Q384. What is the purpose of a DMZ (Demilitarized Zone) in network security?

- A. A restricted military zone on base
- B. A backup network for disaster recovery
- C. A type of encryption algorithm used
- D. A segment separating internal from external networks

Answer: D

Q385. What is port scanning?

- A. A type of data encryption technique
- B. A method to permanently close all ports
- C. Physically inspecting network port hardware
- D. Discovering open ports and services on a target

Answer: D

Q386. What is the purpose of IPSec?

- A. To speed up IP packet routing
- B. To replace TCP with a new protocol
- C. To assign IP addresses to devices
- D. To provide security services at IP layer

Answer: D

Q387. What is the difference between stateful and stateless firewalls?

- A. Stateless firewalls are more secure overall
- B. Stateful tracks connections; stateless filters packets individually
- C. They are the same type of firewall
- D. Stateful firewalls cannot track any connections

Answer: B

Q388. What is a honeypot in network security?

- A. A sweet treat left for hackers to find
- B. A type of firewall with extra logging
- C. An encryption algorithm for secure data
- D. A decoy system to attract and study attackers

Answer: D

Q389. What is the function of a WAF (Web Application Firewall)?

- A. Filtering email messages for spam
- B. Protecting web apps by filtering HTTP traffic
- C. Encrypting web pages for secure storage
- D. Blocking all web traffic on the network

Answer: B

Q390. What is two-factor authentication (2FA)?

- A. Logging into a system twice in succession
- B. Using two different usernames for access
- C. Using two different passwords to log in
- D. Requiring two identification factors to verify identity

Answer: D

Q391. What are the three main use cases of 5G defined by ITU?

- A. Voice, video, and data transfer
- B. Speed, security, and storage capacity
- C. eMBB, URLLC, and mMTC
- D. LAN, WAN, and MAN types

Answer: C

Q392. What is the role of MQTT protocol in IoT?

- A. A lightweight messaging protocol for IoT
- B. Transferring large files between devices
- C. Sending emails from IoT sensors
- D. Browsing websites on IoT devices

Answer: A

Q393. What is OpenFlow in the context of SDN?

- A. A distance vector routing protocol
- B. A type of network firewall
- C. A cloud computing service platform
- D. A protocol between SDN controller and switches

Answer: D

Q394. What is fog computing?

- A. Computing in foggy weather conditions
- B. Computing without any electricity source
- C. A type of cloud storage for backups
- D. Extending cloud computing to the network edge

Answer: D

Q395. What is the main purpose of LPWAN (Low-Power Wide-Area Network)?

- A. Replacing Wi-Fi in home networks
- B. Long-range low-power IoT communication
- C. Streaming high-definition video content
- D. High-speed online gaming connections

Answer: B

Q396. What is an IMS (IP Multimedia Subsystem)?

- A. An internet monitoring system tool
- B. A type of network router device
- C. A framework for multimedia over IP networks
- D. An instant messaging service for users

Answer: C

Q397. What is digital twin technology in the context of networks?

- A. Two identical physical networks side by side
- B. A virtual replica for simulation and monitoring
- C. A backup network for disaster recovery
- D. A VPN technology for secure tunnels

Answer: B

Q398. What is the concept of network automation?

- A. A type of network switch hardware
- B. Networks that never require any maintenance
- C. Using software to auto-configure network devices
- D. Manual network configuration by engineers

Answer: C

Q399. What is Content-Centric Networking (CCN) / Named Data Networking (NDN)?

- A. A paradigm focusing on content not host location
- B. A social networking platform for users
- C. A caching technology for web browsers only
- D. A type of domain name resolution system

Answer: A

Q400. What is Multi-access Edge Computing (MEC)?

- A. Cloud capabilities at the mobile network edge
- B. A type of cloud storage for backups
- C. A Wi-Fi standard for edge networks
- D. Computing on multiple user devices at once

Answer: A

Q401. In Manchester encoding, how is a binary 1 typically represented?

- A. A low-to-high voltage transition at mid-bit
- B. A constant high voltage for the full bit
- C. A high-to-low voltage transition at mid-bit
- D. A constant low voltage for the full bit

Answer: A

Q402. What is the primary advantage of differential Manchester encoding over standard Manchester?

- A. It uses less bandwidth overall
- B. It eliminates the need for any synchronization
- C. It offers better noise immunity via transitions
- D. It provides higher data transfer rate

Answer: C

Q403. Which multiplexing technique assigns unique codes to each channel?

- A. Code Division Multiplexing
- B. Time Division Multiplexing
- C. Wavelength Division Multiplexing
- D. Frequency Division Multiplexing

Answer: A

Q404. What is the main difference between synchronous and asynchronous transmission?

- A. Synchronous uses analog; asynchronous uses digital signals
- B. Synchronous is slower; asynchronous is always faster
- C. Synchronous uses wireless; asynchronous uses wired media
- D. Synchronous uses frames; asynchronous sends individual bytes

Answer: D

Q405. A channel has a bandwidth of 4 kHz and SNR of 31. What is the Shannon capacity?

- A. 24,000 bps
- B. 16,000 bps
- C. 32,000 bps
- D. 20,000 bps

Answer: D

Q406. What causes intersymbol interference (ISI) in digital communication?

- A. Excessive signal amplification at receiver end
- B. Too many repeaters placed along the channel
- C. Spreading of pulses that overlap adjacent symbols
- D. Use of fiber optic cables instead of copper

Answer: C

Q407. In TDM, what happens when a time slot's source has no data to send?

- A. The slot is transmitted empty as a placeholder
- B. The slot is given to another active source
- C. The slot is filled with error correction bits
- D. The entire frame transmission is paused

Answer: A

Q408. What is the purpose of a constellation diagram in digital modulation?

- A. It maps network topology connections visually
- B. It shows signal amplitude and phase combinations
- C. It illustrates the physical layout of cables
- D. It displays the frequency spectrum of a signal

Answer: B

Q409. What is the key advantage of statistical TDM over synchronous TDM?

- A. It dynamically allocates slots to active sources
- B. It provides lower latency for all sources
- C. It removes the need for framing information
- D. It uses wider bandwidth for faster transfers

Answer: A

Q410. What does QAM combine to create multiple signal variations?

- A. Compression and encryption simultaneously
- B. Digital and analog encoding simultaneously
- C. Amplitude and phase modulation together
- D. Frequency and wavelength modulation together

Answer: C

Q411. What is the key difference between a bridge and a switch?

- A. A bridge uses IP addresses; a switch uses MAC addresses
- B. A bridge is wireless; a switch requires wired connections
- C. A bridge works in software; a switch uses hardware ASICs
- D. A bridge operates at Layer 3; a switch at Layer 2 only

Answer: C

Q412. In the TCP/IP model, which layer corresponds to the OSI session and presentation layers?

- A. Network interface layer
- B. Transport layer
- C. Application layer
- D. Internet layer

Answer: C

Q413. What is the purpose of ARP in computer networking?

- A. It assigns domain names to IP addresses
- B. It resolves IP addresses to MAC addresses
- C. It encrypts data at the network layer
- D. It routes packets between different subnets

Answer: B

Q414. What is a collision domain in Ethernet networking?

- A. A network area where firewalls block traffic
- B. A group of devices sharing a broadcast address
- C. A subnet with identical IP address configurations
- D. A segment where simultaneous transmissions can collide

Answer: D

Q415. What is the primary advantage of packet switching over circuit switching?

- A. It offers more efficient use of network bandwidth
- B. It provides guaranteed constant bandwidth to users
- C. It ensures zero packet loss during transmission
- D. It eliminates the need for routing protocols entirely

Answer: A

Q416. What does CSMA/CD stand for and where is it used?

- A. Circuit Switched Multiple Access / Channel Division in MANs
- B. Coded Signal Modulation Access / Carrier Demodulation in PANs
- C. Central Station Multiple Access / Conflict Detection in WANs
- D. Carrier Sense Multiple Access / Collision Detection in LANs

Answer: D

Q417. What is the function of the network layer in the OSI model?

- A. It formats data for presentation to applications
- B. It handles end-to-end error control between processes
- C. It manages logical addressing and packet routing
- D. It establishes and maintains sessions between hosts

Answer: C

Q418. What is the purpose of subnetting in IP networking?

- A. To increase the total number of IP addresses
- B. To divide a network into smaller logical groups
- C. To encrypt data between network segments
- D. To connect wireless and wired networks together

Answer: B

Q419. How does a VLAN differ from a physical LAN?

- A. A VLAN requires separate cables for each group
- B. A VLAN only works with wireless network connections
- C. A VLAN uses IP routing; a LAN uses MAC switching
- D. A VLAN groups devices logically regardless of location

Answer: D

Q420. What is the difference between a broadcast domain and a collision domain?

- A. Collision domains are larger; broadcast domains are per port
- B. Both terms describe exactly the same network concept
- C. Broadcast domains are larger; collision domains are per port
- D. Broadcast domains exist only in wireless network setups

Answer: C

Q421. How does the Go-Back-N ARQ protocol handle frame errors?

- A. It retransmits the error frame and all subsequent frames
- B. It requests the receiver to correct the frame locally
- C. It retransmits only the specific erroneous frame alone
- D. It ignores the error and continues with new frame data

Answer: A

Q422. What is the advantage of Selective Repeat ARQ over Go-Back-N?

- A. It eliminates the need for acknowledgment frames
- B. It only retransmits the specific frames with errors
- C. It provides stronger encryption for transmitted frames
- D. It uses simpler receiver buffer management logic

Answer: B

Q423. What is the purpose of bit stuffing in HDLC framing?

- A. To increase the data transmission speed on the link
- B. To add error correction bits throughout the payload
- C. To prevent data patterns from mimicking frame delimiter
- D. To compress the data payload for efficient transfer

Answer: C

Q424. In CSMA/CA, what does the device do before transmitting?

- A. It requests a dedicated channel from central controller
- B. It sends data immediately without any delay checks
- C. It broadcasts a test packet to check for collisions
- D. It senses the channel and waits if it is already busy

Answer: D

Q425. What is the sliding window protocol's main benefit?

- A. It encrypts frames during transit across network
- B. It converts analog signals to digital frame format
- C. It allows multiple frames in transit simultaneously
- D. It eliminates the need for error detection codes

Answer: C

Q426. What is the binary exponential backoff algorithm used for?

- A. Calculating the optimal frame size for a network
- B. Encoding binary data into Ethernet frame formats
- C. Selecting the fastest route between two endpoints
- D. Determining retransmission wait time after collisions

Answer: D

Q427. How does a learning bridge build its forwarding table?

- A. By examining the source MAC address of incoming frames
- B. By querying a central DHCP server for address mappings
- C. By reading a pre-configured static file at startup
- D. By broadcasting requests to all devices on the network

Answer: A

Q428. What is the purpose of the preamble in an Ethernet frame?

- A. It synchronizes the receiver's clock with the sender
- B. It stores the VLAN tag for traffic prioritization
- C. It carries the destination MAC address information
- D. It contains error correction data for the payload

Answer: A

Q429. In token ring networks, how is channel access managed?

- A. A central controller assigns fixed time slots to nodes
- B. Devices transmit whenever the channel appears free
- C. A special token frame circulates granting send rights
- D. Devices use frequency division to avoid any collisions

Answer: C

Q430. What is the role of the FCS field in a data link frame?

- A. It stores the fragmentation offset for large payloads
- B. It specifies the priority level for quality of service
- C. It identifies the network layer protocol in the payload
- D. It contains the frame check sequence for error detection

Answer: D

Q431. What is the difference between classful and classless IP addressing?

- A. Classful uses fixed boundaries; classless uses variable masks
- B. Classful uses variable masks; classless uses fixed boundaries
- C. Classful supports IPv6; classless only supports IPv4 format
- D. Classful is used in WANs; classless is used in LANs only

Answer: A

Q432. What does CIDR notation /24 mean for an IP address?

- A. The subnet can hold exactly 24 host IP addresses
- B. The first 24 bits are the host portion of address
- C. The address has a total length of 24 bits only
- D. The first 24 bits are the network portion of address

Answer: D

Q433. How does NAT help conserve IPv4 addresses?

- A. It maps multiple private IPs to fewer public IP addresses
- B. It compresses IP headers to use fewer address bits
- C. It assigns temporary addresses that expire after one use
- D. It converts IPv4 addresses directly to IPv6 format

Answer: A

Q434. What is the key difference between distance-vector and link-state routing?

- A. Distance-vector shares routing tables; link-state shares LSA info
- B. Distance-vector shares full topology; link-state shares hop counts
- C. Distance-vector is faster to converge than link-state protocols
- D. Distance-vector uses flooding; link-state uses periodic updates

Answer: A

Q435. What routing protocol uses the Dijkstra algorithm for path computation?

- A. BGP
- B. OSPF
- C. EIGRP
- D. RIP

Answer: B

Q436. What is the purpose of IP fragmentation?

- A. To split large packets to fit the link's maximum unit
- B. To encrypt packets for secure transmission over links
- C. To compress packet headers for faster router processing
- D. To prioritize certain packets over others in the queue

Answer: A

Q437. What is the count-to-infinity problem in distance-vector routing?

- A. Routers keep incrementing hop counts for unreachable routes
- B. Routers count packets infinitely without forwarding any data
- C. Routers exceed their maximum memory for routing table size
- D. The metric value overflows the integer storage in routers

Answer: A

Q438. How does split horizon prevent routing loops?

- A. It divides the routing table into two separate equal halves
- B. It splits the network into isolated routing zones entirely
- C. It uses two different routing protocols simultaneously always
- D. It never advertises a route back to the interface it learned from

Answer: D

Q439. What is the main advantage of IPv6 over IPv4?

- A. IPv6 only works with wireless network connections
- B. IPv6 uses shorter 64-bit addresses for simplicity
- C. IPv6 eliminates the need for any routing protocols
- D. IPv6 provides a vastly larger 128-bit address space

Answer: D

Q440. What is the function of the DHCP protocol?

- A. It dynamically assigns IP addresses to network hosts
- B. It translates MAC addresses into IP address format
- C. It monitors network bandwidth usage across subnets
- D. It encrypts DNS queries for privacy and security

Answer: A

Q441. What is the TCP three-way handshake used for?

- A. To assign port numbers to communicating processes
- B. To encrypt data before transmission starts
- C. To fragment packets for network layer processing
- D. To establish a reliable connection between hosts

Answer: D

Q442. What does the TCP window size control?

- A. The encryption key length for secure connections
- B. The maximum number of TCP connections allowed
- C. The amount of data sent before acknowledgment needed
- D. The physical size of network interface buffers

Answer: C

Q443. How does TCP handle out-of-order segment delivery?

- A. It buffers segments and reorders using sequence numbers
- B. It discards all out-of-order segments immediately
- C. It forwards segments to the application without reordering
- D. It requests the sender to retransmit the entire data stream

Answer: A

Q444. What is the purpose of the TCP checksum field?

- A. It determines the optimal window size for the flow
- B. It identifies the priority level of the data segment
- C. It counts the total number of segments transmitted
- D. It detects errors in the TCP segment during transfer

Answer: D

Q445. What triggers TCP fast retransmit?

- A. Detection of a CRC error in the segment received
- B. A request from the application layer to resend data
- C. Expiration of the retransmission timeout timer
- D. Receipt of three duplicate acknowledgment messages

Answer: D

Q446. What is the difference between flow control and congestion control?

- A. Flow control prevents routing loops; congestion prevents collisions
- B. Flow control is for UDP only; congestion control is TCP only
- C. Flow control manages sender speed; congestion manages network load
- D. Flow control operates at Layer 3; congestion at Layer 4 only

Answer: C

Q447. What is Nagle's algorithm designed to address?

- A. Increasing the throughput for large file transfers
- B. Optimizing the routing of packets across subnets
- C. Preventing unauthorized access to network services
- D. Reducing the overhead from many small TCP segments

Answer: D

Q448. What does the URG flag indicate in a TCP segment?

- A. The receiver should increase its window size
- B. The segment is a retransmission of lost data
- C. The segment contains high-priority urgent data
- D. The connection is being reset by the sender

Answer: C

Q449. Why is UDP preferred over TCP for DNS queries?

- A. UDP provides more reliable delivery for DNS resolution
- B. DNS requires encryption that only UDP provides
- C. UDP's low overhead is ideal for small DNS query packets
- D. DNS queries require the connection setup that UDP offers

Answer: C

Q450. What is a TCP RST segment used for?

- A. To advertise a larger receive window to sender
- B. To initiate a new TCP connection with a server
- C. To abruptly terminate an existing TCP connection
- D. To request retransmission of lost data segments

Answer: C

Q451. What is the difference between POP3 and IMAP for email?

- A. POP3 downloads and deletes; IMAP keeps mail on the server
- B. POP3 uses encryption; IMAP sends messages in plain text
- C. POP3 works offline only; IMAP requires constant connection
- D. POP3 is for sending; IMAP is for receiving email messages

Answer: A

Q452. How does DNS resolution typically work in a recursive query?

- A. The DNS resolver handles the entire lookup on behalf of client
- B. The root server returns the final IP address immediately
- C. The client broadcasts a request to all DNS servers at once
- D. The client queries each DNS server in the hierarchy directly

Answer: A

Q453. What is the purpose of DNS caching?

- A. To speed up repeated lookups by storing recent resolutions
- B. To permanently store all DNS records on every client
- C. To balance the load across multiple DNS server instances
- D. To encrypt DNS queries to prevent eavesdropping attacks

Answer: A

Q454. What is the role of MIME in email communication?

- A. It encrypts the email body for confidential communication
- B. It compresses email attachments to reduce storage space used
- C. It extends email to support non-text attachments and formats
- D. It routes email messages between different mail servers

Answer: C

Q455. What HTTP method is used to submit form data to a server?

- A. HEAD
- B. DELETE
- C. POST
- D. GET

Answer: C

Q456. What is the difference between active and passive FTP modes?

- A. Active is faster; passive provides more reliable file transfer
- B. In active mode the server connects back; in passive the client connects
- C. Active encrypts data; passive transfers data in plain text
- D. Active uses one port; passive uses two ports for data

Answer: B

Q457. What does an HTTP status code 404 indicate?

- A. The client needs to authenticate before accessing resource
- B. The server encountered an internal processing error
- C. The client request was successfully processed by server
- D. The requested resource was not found on the server

Answer: D

Q458. What is the purpose of a reverse proxy server?

- A. It converts HTTP requests into FTP transfer commands
- B. It sits before servers to handle requests on their behalf
- C. It caches web pages for faster client-side browsing
- D. It translates domain names into IP addresses for clients

Answer: B

Q459. How does a CDN improve web content delivery?

- A. It encrypts web traffic to prevent data interception
- B. It compresses all web content to reduce file sizes
- C. It blocks malicious requests before they reach servers
- D. It distributes content to edge servers closer to users

Answer: D

Q460. What is the function of the SSH protocol?

- A. It transfers files using unencrypted connections only
- B. It sends email messages between different mail servers
- C. It provides secure encrypted remote access and commands
- D. It resolves domain names to their IP addresses securely

Answer: C

Q461. What is the key difference between WiFi 5 (802.11ac) and WiFi 6 (802.11ax)?

- A. WiFi 5 uses 2.4 GHz only; WiFi 6 uses 5 GHz band only
- B. WiFi 5 supports MU-MIMO; WiFi 6 does not support it
- C. WiFi 6 introduces OFDMA for better multi-device efficiency
- D. WiFi 6 has shorter range but much higher power consumption

Answer: C

Q462. What security protocol replaced WEP in wireless networks?

- A. SSL
- B. SSH
- C. WPA
- D. IPSec

Answer: C

Q463. What is the purpose of channel bonding in WiFi?

- A. It combines adjacent channels to increase bandwidth
- B. It encrypts data across multiple wireless channels
- C. It reduces interference by separating signal channels
- D. It connects multiple access points into a single unit

Answer: A

Q464. What is MU-MIMO and what problem does it solve?

- A. It modulates signals to reduce power consumption overall
- B. It allows simultaneous transmission to multiple devices
- C. It manages user authentication for wireless network access
- D. It monitors unauthorized intrusions on the wireless network

Answer: B

Q465. How does 5G differ from 4G in terms of architecture?

- A. 5G uses circuit switching; 4G uses packet switching
- B. 5G only works with stationary devices, not mobile ones
- C. 5G uses smaller cells and millimeter wave frequencies
- D. 5G eliminates base stations entirely for all connections

Answer: C

Q466. What is a wireless mesh network?

- A. A network where every device connects to a central hub
- B. A wired backbone connecting multiple wireless access points
- C. A network where nodes relay data for each other wirelessly
- D. A network using satellite links for all communication paths

Answer: C

Q467. What is the role of a wireless controller in enterprise networks?

- A. It encrypts all wired traffic before wireless transmission
- B. It replaces all access points with a single device
- C. It centrally manages and configures multiple access points
- D. It provides internet connectivity to the entire building

Answer: C

Q468. What is the purpose of beamforming in wireless communication?

- A. It focuses the wireless signal toward a specific device
- B. It converts analog signals into digital format wirelessly
- C. It compresses data packets for faster wireless transfer
- D. It spreads the signal equally in all directions around

Answer: A

Q469. What is a handoff (handover) in mobile wireless networks?

- A. The encryption key exchange between device and tower
- B. The initial registration of a device on a mobile network
- C. The process of powering off a mobile device gracefully
- D. The transfer of a connection from one cell to another

Answer: D

Q470. What is the ISM band and why is it significant for WiFi?

- A. A satellite communication band for international broadcasts
- B. An unlicensed band that WiFi and Bluetooth can use freely
- C. A licensed frequency band reserved for military usage
- D. A frequency band used exclusively for medical equipment

Answer: B

Q471. What is the difference between vertical and horizontal scaling?

- A. Vertical is for public cloud; horizontal is for private cloud
- B. Vertical adds more machines; horizontal upgrades existing machines
- C. Vertical upgrades one machine; horizontal adds more machines
- D. Vertical scales storage; horizontal scales computing power only

Answer: C

Q472. What is a container and how does it differ from a virtual machine?

- A. Containers include a full OS; VMs share the host OS kernel
- B. Containers are physical machines; VMs are software abstractions
- C. Containers share the host OS kernel; VMs include a full OS each
- D. Containers only run on private clouds; VMs run on public clouds

Answer: C

Q473. What is the purpose of a hypervisor in cloud computing?

- A. It manages network routing between cloud data centers
- B. It balances internet traffic across multiple web servers
- C. It creates and manages virtual machines on physical hosts
- D. It encrypts data stored in cloud storage services only

Answer: C

Q474. What does serverless computing mean?

- A. Applications run without any servers or infrastructure at all
- B. Applications run entirely on client devices with no backend
- C. The cloud provider manages servers; developers deploy code only
- D. Servers are physically removed from data center facilities

Answer: C

Q475. What is the role of a load balancer in cloud architecture?

- A. It distributes incoming traffic across multiple server instances
- B. It converts database queries into API calls for applications
- C. It monitors the temperature of physical servers in data centers
- D. It compresses data for faster storage on cloud disks

Answer: A

Q476. What is multi-tenancy in cloud computing?

- A. Multiple data centers hosting copies of the same application
- B. Multiple customers sharing the same physical infrastructure
- C. Multiple users accessing a cloud service through one account
- D. Multiple backups of data stored across different regions

Answer: B

Q477. What is the purpose of auto-scaling in cloud environments?

- A. It automatically encrypts data when storage is nearly full
- B. It automatically migrates data between different cloud providers
- C. It automatically adjusts resources based on current demand
- D. It automatically updates software to the latest version only

Answer: C

Q478. What is object storage and how does it differ from block storage?

- A. Object storage is faster; block storage provides better data durability
- B. Object storage is only for images; block storage is for all file types
- C. Object storage uses fixed blocks; block storage uses flexible objects
- D. Object storage stores data as objects with metadata; block uses raw blocks

Answer: D

Q479. What is a cloud region and availability zone?

- A. A region is a city; an availability zone is a building in it
- B. A region is a continent; an availability zone is a country within it
- C. A region is a geographic area; zones are isolated data centers within
- D. A region is a network; zones are different subnets within the network

Answer: C

Q480. What is the shared responsibility model in cloud security?

- A. Security duties are split between the provider and customer
- B. The customer handles all security without provider involvement
- C. A third-party security firm manages all cloud security tasks
- D. The cloud provider handles all security aspects completely

Answer: A

Q481. What is the difference between symmetric and asymmetric encryption?

- A. Symmetric uses one shared key; asymmetric uses a key pair
- B. Symmetric is slower; asymmetric is always faster in practice
- C. Symmetric uses two keys; asymmetric uses a single shared key
- D. Symmetric is for files; asymmetric is only for email messages

Answer: A

Q482. What is a man-in-the-middle (MITM) attack?

- A. An attacker intercepts communication between two parties secretly
- B. An attacker deletes data from the middle of a large database
- C. An attacker blocks only the middle portion of a data stream
- D. An attacker physically sits between two network servers

Answer: A

Q483. What is the purpose of an Intrusion Detection System (IDS)?

- A. It manages user passwords across the entire network
- B. It encrypts all data stored on network servers securely
- C. It monitors network traffic for suspicious activities
- D. It blocks all incoming network traffic automatically

Answer: C

Q484. How does a digital certificate work?

- A. It stores all user passwords in an encrypted database file
- B. It binds a public key to an entity verified by a trusted CA
- C. It routes encrypted traffic through the shortest network path
- D. It compresses encrypted data for faster transfer speeds

Answer: B

Q485. What is the purpose of network segmentation for security?

- A. To compress network traffic for more efficient routing
- B. To increase the overall network bandwidth capacity
- C. To merge multiple networks into one unified network
- D. To isolate network zones and limit breach impact spread

Answer: D

Q486. What is a DDoS attack and how does it differ from DoS?

- A. DDoS targets databases; DoS targets web servers exclusively
- B. DDoS originates from multiple sources; DoS from a single source
- C. DDoS is legal; DoS is the only illegal form of this attack
- D. DDoS uses encryption; DoS uses plain text for attacks

Answer: B

Q487. What is the principle of least privilege in security?

- A. Users should have only the minimum access rights they need
- B. Users should have all permissions to avoid workflow delays
- C. Users should share credentials to simplify access management
- D. Users should change permissions weekly for security rotation

Answer: A

Q488. What is the purpose of a DMZ in network architecture?

- A. It connects two private networks using encrypted tunnels
- B. It manages wireless access point configuration remotely
- C. It compresses all outgoing traffic to save internet bandwidth
- D. It hosts public-facing services isolated from the internal net

Answer: D

Q489. What is port scanning used for in network security?

- A. It assigns port numbers to newly installed server applications
- B. It discovers open ports and services on a target system
- C. It physically scans network cables for damage or breaks
- D. It increases the number of available network ports on switch

Answer: B

Q490. What is the role of TLS in network security?

- A. It manages domain name registration for web applications
- B. It monitors disk space usage on networked file servers
- C. It provides encryption for data in transit between endpoints
- D. It assigns IP addresses to devices on the local network

Answer: C

Q491. How does network automation improve operations?

- A. It eliminates all security vulnerabilities automatically
- B. It reduces manual tasks and human errors in configuration
- C. It replaces networking protocols with machine learning only
- D. It removes the need for any network hardware devices

Answer: B

Q492. What is the concept of intent-based networking?

- A. Networks that intentionally drop packets for load testing
- B. Networks that translate business intent into automated policies
- C. Networks that only connect devices with matching firmware
- D. Networks that administrators configure line by line manually

Answer: B

Q493. What is the role of blockchain in next-generation networks?

- A. It compresses network traffic to reduce bandwidth consumption
- B. It increases WiFi signal range through distributed antennas
- C. It replaces TCP/IP as the fundamental networking protocol
- D. It provides decentralized trust and secure transaction records

Answer: D

Q494. What is multi-access edge computing (MEC)?

- A. A technique for connecting multiple keyboard and mouse devices
- B. A method of storing data on multiple hard drives for backup
- C. Computing at the edge of the mobile network for low latency
- D. A protocol for accessing email from multiple client devices

Answer: C

Q495. How do digital twins benefit network management?

- A. They create physical copies of network equipment for backup
- B. They provide two-factor authentication for network access
- C. They double the network bandwidth by mirroring all traffic
- D. They simulate network behavior for testing without real impact

Answer: D

Q496. What is the significance of LPWAN for IoT deployments?

- A. It provides high-bandwidth connections for video streaming
- B. It replaces all existing WiFi standards with a new protocol
- C. It offers ultra-fast speeds for gaming and virtual reality
- D. It enables long-range, low-power connectivity for IoT sensors

Answer: D

Q497. What is the purpose of network telemetry?

- A. It collects real-time operational data from network devices
- B. It controls satellite communications for space networks
- C. It encrypts all management traffic on the network devices
- D. It provides telephone services over computer network lines

Answer: A

Q498. How does AIOps enhance network operations?

- A. It replaces all network devices with AI-powered hardware
- B. It uses AI and ML to automate and improve IT operations
- C. It generates artificial network traffic for testing purposes
- D. It provides artificial internet connections for offline work

Answer: B

Q499. What is the concept of network as a service (NaaS)?

- A. A free network service provided by government to all citizens
- B. Consuming networking capabilities as a cloud-delivered service
- C. A network that only provides services during business hours
- D. A physical network installed by the service provider on site

Answer: B

Q500. What is the role of quantum computing in future networks?

- A. It eliminates the need for any physical network connections
- B. It replaces all existing encryption methods with weaker ones
- C. It reduces the cost of network hardware to nearly zero price
- D. It promises faster processing and new cryptographic methods

Answer: D

Q501. What is the relationship between bit rate and baud rate in QPSK modulation?

- A. Bit rate is twice the baud rate value
- B. Bit rate equals the baud rate exactly
- C. Bit rate is four times the baud rate
- D. Bit rate is half the baud rate value

Answer: A

Q502. What is the primary purpose of line coding in digital communication?

- A. To multiplex several analog voice channels
- B. To convert digital data into digital signals
- C. To compress data before wireless transmission
- D. To encrypt data for secure communication

Answer: B

Q503. In Frequency Division Multiplexing, what prevents interference between channels?

- A. Time slots assigned to each channel
- B. Unique code sequences per channel
- C. Guard bands separating frequency ranges
- D. Priority levels for each data stream

Answer: C

Q504. What is the advantage of NRZ-I encoding over NRZ-L encoding?

- A. NRZ-I doubles the effective data rate
- B. NRZ-I uses less bandwidth per signal
- C. NRZ-I eliminates all baseline wander
- D. NRZ-I provides better clock synchronization

Answer: D

Q505. A channel has a bandwidth of 6 kHz. Using the Nyquist formula with 4 signal levels, what is the maximum data rate?

- A. 24 kbps with 4 levels encoding
- B. 48 kbps with 4 levels encoding
- C. 36 kbps with 4 levels encoding
- D. 12 kbps with 4 levels encoding

Answer: A

Q506. What is the primary difference between baseband and broadband transmission?

- A. Broadband uses digital signals on the entire bandwidth while baseband divides it
- B. Baseband uses digital signals on the entire bandwidth while broadband divides it
- C. Baseband supports higher data rates than broadband transmission systems
- D. Broadband can only carry a single channel at any given time

Answer: B

Q507. What problem does scrambling solve in data communication systems?

- A. It compresses data for faster throughput
- B. It increases signal power for long cables
- C. It reduces latency in fiber optic networks
- D. It avoids long sequences of constant bits

Answer: D

Q508. In Phase Shift Keying (PSK), what property of the carrier signal is modified?

- A. The phase of the carrier wave signal
- B. The frequency of the carrier wave
- C. The wavelength of the carrier wave
- D. The amplitude of the carrier wave

Answer: A

Q509. What is the role of an equalizer in a data communication receiver?

- A. To amplify signals for longer distances
- B. To compensate for signal distortion caused by the channel
- C. To encrypt incoming data for secure storage
- D. To convert analog signals into digital format

Answer: B

Q510. In Amplitude Shift Keying (ASK), how are binary values represented?

- A. By changing the frequency between two values
- B. By shifting the phase at each bit boundary
- C. By varying the amplitude of the carrier wave
- D. By combining frequency and phase variations

Answer: C

Q511. What is the primary difference between a Layer 2 switch and a Layer 3 switch?

- A. Layer 2 switches support wireless clients while Layer 3 cannot
- B. Layer 3 switches can perform routing based on IP addresses
- C. Layer 2 switches are faster but less reliable than Layer 3 switches
- D. Layer 3 switches only operate in star topology networks

Answer: B

Q512. What is the purpose of the encapsulation process in the OSI model?

- A. To remove headers as data moves down the layers
- B. To compress data at each layer for faster transmission
- C. To encrypt data at every layer for maximum security
- D. To add protocol information as data descends through layers

Answer: D

Q513. What is the function of the Address Resolution Protocol (ARP)?

- A. It assigns dynamic IP addresses to new network devices
- B. It resolves port numbers to specific running applications
- C. It maps IP addresses to their corresponding MAC addresses
- D. It maps domain names to their corresponding IP addresses

Answer: C

Q514. How does a switch learn which MAC addresses are on which ports?

- A. By examining the source MAC address of incoming frames
- B. By reading configuration files loaded at startup
- C. By querying a central MAC address database server
- D. By broadcasting ARP requests to all connected devices

Answer: A

Q515. What is the difference between unicast, multicast, and broadcast transmissions?

- A. Broadcast sends to one, unicast to a group, multicast to all
- B. Multicast sends to one, broadcast to a group, unicast to all
- C. Unicast sends to all, broadcast to a group, multicast to one
- D. Unicast sends to one, multicast to a group, broadcast to all

Answer: D

Q516. What does the data link layer PDU (Protocol Data Unit) consist of?

- A. Frames with MAC headers and trailer fields
- B. Packets with IP headers and payload data
- C. Bits transmitted as raw signals on the wire
- D. Segments with port numbers and sequence info

Answer: A

Q517. What is store-and-forward switching in a network switch?

- A. The switch only forwards broadcast frames to all ports
- B. The switch receives the entire frame before forwarding it
- C. The switch forwards frames before fully receiving them
- D. The switch stores frames indefinitely until requested

Answer: B

Q518. What is the purpose of RARP (Reverse Address Resolution Protocol)?

- A. It translates private IP addresses to public ones
- B. It resolves hostnames into IP address records
- C. It converts MAC addresses back to IP addresses
- D. It maps port numbers to application layer services

Answer: C

Q519. In a network with multiple paths, what advantage does load balancing provide?

- A. It assigns static IP addresses to all network devices
- B. It blocks redundant paths to simplify routing tables
- C. It distributes traffic across paths to optimize utilization
- D. It encrypts all traffic across different network paths

Answer: C

Q520. What is the role of the session layer in the OSI model?

- A. It converts data formats between different system types
- B. It handles physical transmission of bits across the medium
- C. It performs routing and logical addressing for packets
- D. It manages dialog control and synchronization between hosts

Answer: D

Q521. In the Go-Back-N protocol, what does the sender do when a timer expires for an unacknowledged frame?

- A. It waits for the receiver to send a negative acknowledgment
- B. It resends only the specific frame that timed out
- C. It closes the connection and initiates a new session
- D. It resends the timed-out frame and all subsequent sent frames

Answer: D

Q522. What is the difference between error detection and error correction?

- A. Detection finds errors and requests retransmission while correction fixes them directly
- B. Detection finds and fixes errors while correction only finds them
- C. Detection uses parity bits while correction uses checksum only
- D. Detection works only for burst errors while correction handles single-bit errors

Answer: A

Q523. What is the purpose of the interframe gap in Ethernet transmission?

- A. To synchronize clocks of all devices on the network
- B. To encrypt the gap between successive data frames
- C. To carry management data between consecutive frames
- D. To provide minimum idle time between frame transmissions

Answer: D

Q524. How does a two-dimensional parity check improve over simple parity?

- A. It only works with even numbers of data bytes in each block
- B. It can detect and correct single-bit errors in the data block
- C. It uses half the number of check bits compared to simple parity
- D. It eliminates the need for any retransmission of faulty frames

Answer: B

Q525. What is the piggybacking technique in data link layer protocols?

- A. Attaching acknowledgments to outgoing data frames to save bandwidth
- B. Compressing frame headers to reduce per-frame transmission overhead
- C. Duplicating frames across two links for redundancy and reliability
- D. Sending multiple data frames inside a single larger container frame

Answer: A

Q526. In CSMA/CD, what is the minimum frame size related to?

- A. The maximum number of devices on the network segment
- B. The total available bandwidth on the shared cable medium
- C. The round-trip propagation delay of the collision domain
- D. The processor speed of the transmitting network device

Answer: C

Q527. What is the spanning tree port state 'blocking' used for?

- A. The port is disabled and cannot receive any traffic
- B. The port is actively forwarding user data frames
- C. The port does not forward frames to prevent network loops
- D. The port is learning MAC addresses from incoming frames

Answer: C

Q528. What is the purpose of the jam signal in CSMA/CD?

- A. To request priority access to the shared transmission medium
- B. To notify all stations that a collision has been detected
- C. To test the cable for faults before data is transmitted
- D. To synchronize the clocks of all stations on the network

Answer: B

Q529. What is the role of the Logical Link Control (LLC) sublayer in frame handling?

- A. It provides an interface between the network layer and MAC sublayer
- B. It manages collision detection on shared Ethernet segments
- C. It handles physical signal encoding on the transmission medium
- D. It assigns physical addresses to each networked device

Answer: A

Q530. What is a transparent bridge and how does it operate?

- A. It requires manual configuration of all forwarding table entries
- B. It forwards frames based on IP addresses and routing tables
- C. It operates only between networks using different data link protocols
- D. It learns and forwards frames based on MAC addresses invisibly to hosts

Answer: D

Q531. What is the administrative distance used for in routing?

- A. It measures the physical distance between two routers in meters
- B. It ranks the trustworthiness of routing information sources
- C. It calculates the total bandwidth available on a route path
- D. It determines the maximum number of hops allowed on a route

Answer: B

Q532. In OSPF, what is a Link State Advertisement (LSA)?

- A. A message containing information about a router's links and their states
- B. A request sent to the designated router for database synchronization
- C. A packet used to discover neighboring OSPF routers on a link
- D. An acknowledgment confirming receipt of routing table updates

Answer: A

Q533. What is the purpose of the Don't Fragment (DF) flag in the IPv4 header?

- A. It marks the packet as the final fragment in a sequence
- B. It indicates the packet has already been fragmented once
- C. It instructs routers not to fragment the packet along the path
- D. It requests priority handling to avoid fragmentation delays

Answer: C

Q534. How does proxy ARP work in a network?

- A. A switch duplicates ARP requests and sends them to all VLANs
- B. A host caches ARP entries for all devices on the entire internet
- C. A firewall blocks ARP requests from unauthorized network segments
- D. A router answers ARP requests on behalf of hosts on another network

Answer: D

Q535. What is the difference between RIPv1 and RIPv2?

- A. RIPv1 supports VLSM and authentication while RIPv2 does not
- B. RIPv2 supports VLSM and multicast updates while RIPv1 does not
- C. RIPv2 has unlimited hop count while RIPv1 is limited to 15 hops
- D. RIPv1 uses link-state algorithm while RIPv2 uses distance-vector

Answer: B

Q536. What is the purpose of the OSPF hello protocol?

- A. To discover neighbors and maintain adjacency relationships
- B. To redistribute routes from other routing protocols into OSPF
- C. To calculate the shortest path using Dijkstra algorithm
- D. To exchange full routing tables between all OSPF routers

Answer: A

Q537. What is the purpose of the Identification field in the IPv4 header?

- A. It determines the priority level of the packet for QoS processing
- B. It specifies the version of the IP protocol being used
- C. It stores the checksum value for header integrity verification
- D. It uniquely identifies fragments belonging to the same original packet

Answer: D

Q538. What is the longest prefix match rule in IP routing?

- A. The route with the most hops to the destination is preferred
- B. The route learned from the oldest routing protocol is chosen
- C. The route with the most specific (longest) subnet mask is selected
- D. The route with the lowest administrative distance is preferred

Answer: C

Q539. What is the multicast address range in IPv4?

- A. 192.168.0.0 to 192.168.255.255 range
- B. 224.0.0.0 to 239.255.255.255 range
- C. 172.16.0.0 to 172.31.255.255 range
- D. 240.0.0.0 to 255.255.255.254 range

Answer: B

Q540. What is the purpose of ICMP redirect messages?

- A. To request a DNS resolver to redirect queries elsewhere
- B. To redirect all network traffic through a backup gateway
- C. To inform a host of a better route for a specific destination
- D. To notify the sender that a packet has been fragmented

Answer: C

Q541. How does TCP's sliding window mechanism improve throughput?

- A. It compresses data within each segment to reduce packet size
- B. It allows multiple segments to be sent before requiring acknowledgment
- C. It chooses the fastest network path for each individual segment
- D. It eliminates the need for sequence numbers in the TCP header

Answer: B

Q542. What is the purpose of the TCP Maximum Segment Size (MSS) option?

- A. It specifies the largest data payload a segment can carry
- B. It sets the timeout value for retransmission of segments
- C. It limits the total number of segments in a connection
- D. It determines the maximum window size for flow control

Answer: A

Q543. What happens during the TCP connection termination process?

- A. Both sides exchange FIN and ACK segments in a four-step process
- B. A single FIN segment from either side terminates the connection
- C. The server unilaterally closes the connection without client input
- D. One side sends a RST and the connection immediately closes

Answer: A

Q544. What is the TCP retransmission timeout (RTO) based on?

- A. The number of segments currently in the send buffer queue
- B. Estimated round-trip time and its variation for the connection
- C. A fixed interval of exactly 3 seconds for all connections
- D. The bandwidth of the network interface used for transmission

Answer: B

Q545. What is the difference between TCP's cumulative and selective acknowledgment?

- A. Cumulative ACKs work only with UDP while selective ACK works only with TCP
- B. Selective ACK confirms all data up to a point while cumulative identifies specific ranges
- C. Selective ACK requires more bandwidth but cumulative ACK causes more retransmissions
- D. Cumulative ACKs confirm all data up to a point while SACK identifies specific received ranges

Answer: D

Q546. What is the purpose of the TCP congestion window (cwnd)?

- A. It limits the total number of connections a server can accept
- B. It determines the priority of segments during network congestion
- C. It controls how much data the sender can transmit before receiving ACKs
- D. It specifies the maximum receive buffer size at the destination

Answer: C

Q547. What is delayed acknowledgment in TCP?

- A. The sender delays retransmission until multiple timeouts have occurred
- B. The sender delays sending data until it accumulates a full-size segment
- C. The receiver discards ACKs for duplicate segments to save bandwidth
- D. The receiver waits briefly before sending an ACK hoping to piggyback it with data

Answer: D

Q548. How does UDP handle data that arrives out of order?

- A. UDP buffers packets until all segments arrive then delivers them
- B. UDP discards out-of-order packets and requests retransmission
- C. UDP delivers data to the application in whatever order it arrives
- D. UDP reorders segments using sequence numbers before delivery

Answer: C

Q549. What does the TCP window scale option allow?

- A. It enables window sizes larger than the 16-bit field allows
- B. It dynamically adjusts the MSS during data transfer
- C. It reduces the header size for low-bandwidth connections
- D. It compresses window update notifications between peers

Answer: A

Q550. What is the purpose of the TCP keepalive mechanism?

- A. To periodically refresh the routing path for the TCP connection
- B. To detect if the other end of an idle connection is still reachable
- C. To prevent the congestion window from shrinking during idle time
- D. To maintain data throughput at a constant rate during transfers

Answer: B

Q551. What is the difference between iterative and recursive DNS queries?

- A. In iterative, the server resolves the query completely; in recursive, it returns a referral
- B. In recursive, the server resolves the query completely; in iterative, it returns a referral
- C. Recursive queries use TCP while iterative queries always use UDP protocol
- D. Iterative queries bypass caching while recursive queries always check cache first

Answer: B

Q552. What HTTP status code range indicates a client error?

- A. 300-399 redirection response code range
- B. 100-199 informational response codes
- C. 400-499 client error response code range
- D. 200-299 successful response code range

Answer: C

Q553. What is the purpose of HTTP cookies?

- A. To compress web page content for faster loading times
- B. To encrypt communication between browser and web server
- C. To validate the digital certificate of a web server
- D. To store state information for the stateless HTTP protocol

Answer: D

Q554. What is the DNS TTL (Time-to-Live) field used for?

- A. To specify how long a DNS record can be cached before refresh
- B. To set the maximum size of a DNS response message packet
- C. To limit the number of hops a DNS query can traverse
- D. To determine the priority of DNS servers for a domain

Answer: A

Q555. What is the purpose of the HTTP PUT method?

- A. To delete the resource located at the specified URI
- B. To retrieve a resource from the specified server URI
- C. To replace the entire resource at the specified URI
- D. To append data to an existing resource on the server

Answer: C

Q556. What is the CNAME record used for in DNS?

- A. To create an alias that points to another domain name
- B. To specify the text-based description of a DNS zone
- C. To map a domain name to an IPv6 address for hosts
- D. To define the service location for specific protocols

Answer: A

Q557. What is the difference between SFTP and FTPS?

- A. FTPS is faster than SFTP because it has less encryption overhead
- B. SFTP runs over SSH while FTPS adds TLS/SSL to the FTP protocol
- C. FTPS runs over SSH while SFTP adds TLS/SSL to the FTP protocol
- D. SFTP uses port 990 while FTPS uses port 22 for connections

Answer: B

Q558. What is the purpose of the HTTP Content-Type header?

- A. It defines the maximum size of the request or response payload
- B. It specifies the encoding used to compress the response body
- C. It authenticates the client making the HTTP request to the server
- D. It indicates the media type of the resource being sent or received

Answer: D

Q559. What is the role of a DNS root server in the name resolution hierarchy?

- A. It assigns new domain names to registrars for public sale
- B. It caches resolved DNS entries for all ISP customers worldwide
- C. It directs queries to the appropriate top-level domain servers
- D. It stores all DNS records for every domain on the internet

Answer: C

Q560. What is the HTTP 301 status code used to indicate?

- A. The requested resource was temporarily unavailable for maintenance
- B. The requested resource has been permanently moved to a new URL
- C. The server encountered an internal error processing the request
- D. The client must authenticate before accessing the resource

Answer: B

Q561. What is the primary benefit of WiFi 6E over WiFi 6?

- A. WiFi 6E removes backward compatibility to improve overall performance
- B. WiFi 6E adds the 6 GHz band providing more channels and less congestion
- C. WiFi 6E doubles the range of WiFi 6 using advanced antenna designs
- D. WiFi 6E uses a completely new modulation scheme for higher speeds

Answer: B

Q562. What is the purpose of the Distributed Coordination Function (DCF) in WiFi?

- A. It provides contention-based medium access using CSMA/CA for all stations
- B. It coordinates frequency hopping between channels to avoid interference
- C. It reserves dedicated time slots for each connected wireless device
- D. It centrally manages all wireless transmissions through the access point

Answer: A

Q563. What is roaming in enterprise wireless networks?

- A. The process of manually switching between different WiFi networks
- B. The technique of increasing transmission power for broader coverage
- C. The method of assigning static IP addresses to mobile wireless devices
- D. The automatic transition of a client between access points within a network

Answer: D

Q564. What is the difference between omnidirectional and directional antennas?

- A. Directional radiates in all horizontal directions while omnidirectional focuses signal in one
- B. Omnidirectional radiates in all horizontal directions while directional focuses signal in one
- C. Directional antennas have lower gain than omnidirectional antennas in all cases
- D. Omnidirectional works only indoors while directional is designed for outdoor use only

Answer: B

Q565. What does the term 'cell' refer to in cellular network architecture?

- A. A geographic area covered by a single base station
- B. A group of frequencies reserved for emergency calls
- C. The encryption module inside a cellular modem chip
- D. The battery unit that powers each mobile device

Answer: A

Q566. What is the purpose of the association process in WiFi?

- A. It assigns a fixed wireless channel to the connecting client device
- B. It discovers all available WiFi networks in the surrounding area
- C. It establishes a logical connection between a client and an access point
- D. It encrypts the data channel between client and access point

Answer: C

Q567. What is the dual-band capability in modern WiFi routers?

- A. The ability to connect to two internet service providers at the same time
- B. The ability to broadcast two separate SSIDs on the same frequency band
- C. The ability to operate on both 2.4 GHz and 5 GHz frequency bands simultaneously
- D. The ability to support both WPA2 and WPA3 security protocols concurrently

Answer: C

Q568. What is the function of the NAV (Network Allocation Vector) in WiFi?

- A. It acts as a virtual carrier sensing timer to reserve the channel
- B. It allocates IP addresses to wireless network participants
- C. It stores the routing table for wireless mesh networks
- D. It manages authentication keys for wireless client devices

Answer: A

Q569. What is the difference between BSS (Basic Service Set) and ESS (Extended Service Set)?

- A. ESS consists of one AP and its clients while BSS connects multiple ESSs together
- B. BSS consists of one AP and its clients while ESS connects multiple BSSs together
- C. ESS supports only wired connections while BSS supports only wireless connections
- D. BSS uses WPA3 encryption while ESS only supports the older WPA2 standard

Answer: B

Q570. What technology does 5G use to handle many connected IoT devices simultaneously?

- A. Frequency Division Multiple Access with guard bands
- B. Single-carrier modulation with higher power output
- C. Circuit switching with dedicated device channels
- D. Massive MIMO with hundreds of antenna elements

Answer: D

Q571. What is the difference between a Type 1 and Type 2 hypervisor?

- A. Type 1 runs directly on hardware while Type 2 runs on a host operating system
- B. Type 2 provides better performance than Type 1 in all cloud deployments
- C. Type 1 supports only Linux guests while Type 2 supports any guest operating system
- D. Type 2 runs directly on hardware while Type 1 runs on a host operating system

Answer: A

Q572. What is the purpose of a container orchestration platform?

- A. It compiles application source code into container images
- B. It converts virtual machines into lightweight container instances
- C. It provides a graphical interface for designing container architectures
- D. It automates deployment, scaling, and management of containerized applications

Answer: D

Q573. What is the concept of cloud-native microservices architecture?

- A. A single large database shared by all application components in the cloud
- B. A method of migrating legacy mainframe applications directly to cloud servers
- C. An approach where applications are built as small, independent, deployable services
- D. A monolithic application deployed entirely within a single cloud virtual machine

Answer: C

Q574. What is the purpose of a content delivery network (CDN) in cloud architecture?

- A. It manages database replication across multiple cloud data regions
- B. It caches and delivers content from edge locations closest to users
- C. It provides computing resources for running backend application logic
- D. It handles user authentication for cloud-hosted web applications

Answer: B

Q575. What is the difference between block storage and file storage in cloud?

- A. File storage manages raw storage volumes while block storage provides a file system hierarchy
- B. File storage offers higher performance than block storage in all scenarios
- C. Block storage manages raw storage volumes while file storage provides a file system hierarchy
- D. Block storage is only for databases while file storage is only for media content

Answer: C

Q576. What is a cloud function (Function as a Service)?

- A. A dedicated server leased monthly for running specific application workloads
- B. A small piece of code executed in response to events without managing servers
- C. A database query engine hosted in the cloud for analytical processing
- D. A virtual machine running continuously to handle all incoming requests

Answer: B

Q577. What is the purpose of cloud resource tagging?

- A. To label resources with metadata for organization, billing, and management
- B. To encrypt resources with unique security tokens for access control
- C. To assign priority levels to cloud resources during peak usage times
- D. To physically mark server hardware for identification in data centers

Answer: A

Q578. What is the concept of cloud data sovereignty?

- A. The ability of cloud users to access data from any global location
- B. The encryption standard used to protect data stored in cloud servers
- C. The cloud provider's guarantee of permanent data availability worldwide
- D. The legal requirement that data is subject to laws of the country where it resides

Answer: D

Q579. What is a VPC (Virtual Private Cloud)?

- A. An isolated virtual network within a public cloud for a customer's resources
- B. A VPN tunnel connecting an office to the internet through cloud proxy
- C. A physical data center dedicated exclusively to one customer
- D. A virtual machine with enhanced security features enabled by default

Answer: A

Q580. What is the difference between reserved and spot instances in cloud computing?

- A. Reserved instances are temporary while spot instances provide guaranteed availability
- B. Spot instances require long-term contracts while reserved instances are pay-per-use
- C. Spot instances are more expensive but offer better performance than reserved ones
- D. Reserved instances are cheaper with commitment while spot instances offer discounts on spare capacity

Answer: D

Q581. What is the difference between a vulnerability scan and a penetration test?

- A. A penetration test uses automated tools while a vulnerability scan requires manual testing
- B. A vulnerability scan actively exploits weaknesses while a penetration test only identifies them
- C. A vulnerability scan identifies weaknesses automatically while a penetration test actively exploits them
- D. Both vulnerability scans and penetration tests perform identical security assessment functions

Answer: C

Q582. What is the purpose of Multi-Factor Authentication (MFA)?

- A. To allow users to access systems with any single form of identification
- B. To distribute authentication requests across multiple authentication servers
- C. To encrypt user credentials using multiple encryption algorithms simultaneously
- D. To require multiple verification methods from different authentication categories

Answer: D

Q583. What is a SQL injection attack?

- A. An attack that intercepts SQL queries between application and database
- B. An attack that inserts malicious SQL code through application input fields
- C. An attack that floods a database server with excessive connection requests
- D. An attack that physically damages database storage hardware components

Answer: B

Q584. What is the purpose of network access control (NAC)?

- A. To accelerate network traffic through quality of service policies
- B. To manage the physical cabling infrastructure of the enterprise network
- C. To enforce security policies on devices before granting network access
- D. To compress network traffic headers for bandwidth conservation

Answer: C

Q585. What is a Cross-Site Scripting (XSS) attack?

- A. An attack that injects malicious scripts into web pages viewed by other users
- B. An attack that blocks access to a website through distributed denial requests
- C. An attack that redirects website visitors to a cloned phishing site
- D. An attack that exploits expired SSL certificates on insecure web servers

Answer: A

Q586. What is the purpose of RADIUS (Remote Authentication Dial-In User Service)?

- A. To encrypt all data transmitted between wireless clients and access points
- B. To manage DHCP address assignments for remote VPN client connections
- C. To detect and prevent unauthorized wireless access points on the network
- D. To provide centralized authentication, authorization, and accounting for network access

Answer: D

Q587. What is the concept of defense in depth in network security?

- A. Using the deepest encryption algorithm available for all data types
- B. Implementing multiple layers of security controls throughout a system
- C. Deploying security measures only at the network perimeter boundary
- D. Relying on a single strong firewall to protect the entire network

Answer: B

Q588. What is the purpose of a digital signature?

- A. To verify the sender's identity and ensure message integrity
- B. To route signed messages through prioritized network paths
- C. To encrypt the entire message content for confidentiality
- D. To compress messages for faster network transmission speed

Answer: A

Q589. What is a VLAN hopping attack?

- A. An attack that rapidly changes VLAN assignments to cause network instability
- B. An attack that disables VLAN trunking between switches to isolate network segments
- C. An attack where an unauthorized user gains access to a wireless VLAN
- D. An attack that allows an attacker to access traffic on other VLANs bypassing segmentation

Answer: D

Q590. What is the role of hashing in password storage?

- A. It encrypts passwords so they can be decrypted and verified during login
- B. It duplicates passwords across multiple servers for redundancy and availability
- C. It converts passwords into fixed-length values that cannot be reversed to reveal the original
- D. It compresses passwords to reduce the storage space needed in databases

Answer: C

Q591. What is the purpose of a digital twin in network operations?

- A. To duplicate network traffic for load balancing across twin paths
- B. To pair every physical device with an identical standby device
- C. To build a virtual replica of a network for simulation and planning
- D. To create an identical backup of all network hardware equipment

Answer: C

Q592. What is the concept of network function chaining in NFV?

- A. Linking network monitoring tools to create a unified dashboard view
- B. Physically connecting network appliances in a serial chain with cables
- C. Chaining multiple physical firewalls together for redundant protection
- D. Directing traffic through an ordered sequence of virtual network functions

Answer: D

Q593. What is the role of YANG data modeling language in network automation?

- A. It generates graphical network topology diagrams automatically
- B. It models the structure of network device configuration and state data
- C. It defines the programming logic for automated network scripts
- D. It encrypts network automation commands for secure transmission

Answer: B

Q594. What is the concept of network slicing in 5G architecture?

- A. Creating multiple virtual networks on shared physical infrastructure for different needs
- B. Slicing large data packets into smaller fragments for transmission
- C. Dividing the radio spectrum into equal frequency slices for all users
- D. Physically dividing network cables into thinner sections for more connections

Answer: A

Q595. What is the NETCONF protocol used for in network management?

- A. It provides a mechanism to configure and manage network devices programmatically
- B. It encrypts network traffic between data center and branch offices
- C. It monitors network performance through passive packet capture
- D. It distributes network routing updates between autonomous systems

Answer: A

Q596. What is the concept of Vehicle-to-Everything (V2X) communication?

- A. A system for transmitting vehicle diagnostic data to repair shops
- B. A cellular network dedicated to providing entertainment in vehicles
- C. Communication between vehicles and infrastructure, pedestrians, and other vehicles
- D. A satellite navigation system designed exclusively for commercial vehicles

Answer: C

Q597. What is the purpose of an IoT gateway device?

- A. It generates power for battery-free IoT sensor devices
- B. It provides cloud computing resources directly to IoT sensors
- C. It physically protects IoT devices from environmental damage
- D. It bridges communication between IoT devices and cloud or enterprise networks

Answer: D

Q598. What is the concept of haptic communication in next-generation networks?

- A. Communication limited to text-based messaging protocols only
- B. Communication that transmits touch and force feedback over a network
- C. Communication using visible light instead of radio frequencies
- D. Communication between devices using acoustic sound wave signals

Answer: B

Q599. What is the significance of Open RAN (O-RAN) for mobile network operators?

- A. It requires operators to use a single vendor for all radio access equipment
- B. It enables interoperable multi-vendor radio access network components
- C. It eliminates the need for physical cell towers in mobile network design
- D. It restricts RAN deployment to only open-source software implementations

Answer: B

Q600. What is the purpose of a Software-Defined WAN (SD-WAN)?

- A. To eliminate the need for WAN connectivity between branch offices
- B. To replace all WAN links with a single high-speed fiber connection
- C. To physically define WAN boundaries using software-generated maps
- D. To intelligently manage WAN connections using software-based controls

Answer: D

Hard Questions

300 questions

Q601. A channel has a bandwidth of 4 KHz and SNR of 63. What is the maximum achievable data rate according to Shannon's theorem?

- A. 24 Kbps
- B. 12 Kbps
- C. 48 Kbps
- D. 36 Kbps

Answer: A

Q602. In CDMA (Code Division Multiple Access), if a station's chip sequence is (-1, -1, -1, +1, +1, -1, +1, +1) and the received data is (-1, -1, -3, +1, -1, -3, +1, +1), what is the station's data bit?

- A. Indeterminate
- B. Bit is -1
- C. Bit is +1
- D. Bit is 0

Answer: C

Q603. What is the main disadvantage of Differential Manchester encoding compared to standard Manchester encoding?

- A. It is more complex to implement
- B. It requires more bandwidth
- C. It lacks self-clocking ability
- D. It has higher error rates

Answer: A

Q604. In a QAM-16 constellation diagram, how many bits does each signal element represent?

- A. 2 bits
- B. 3 bits
- C. 8 bits
- D. 4 bits

Answer: D

Q605. A signal has passed through 3 cascaded amplifiers, each with a gain of 10 dB. If the original signal power is 5 mW, what is the output power?

- A. 5000 mW
- B. 50000 mW
- C. 500 mW
- D. 50 mW

Answer: A

Q606. In Statistical Time Division Multiplexing (STDM), what is the key advantage over synchronous TDM?

- A. It allocates time slots based on demand
- B. It guarantees lower latency always
- C. It offers simpler implementation
- D. It provides higher total bandwidth

Answer: A

Q607. A digitized voice channel is made by sampling at 8000 samples/sec with 8 bits per sample. What is the required data rate?

- A. 32 Kbps
- B. 128 Kbps
- C. 64 Kbps
- D. 48 Kbps

Answer: C

Q608. Which scrambling technique replaces 8 consecutive zeros with a specific violation pattern to maintain synchronization?

- A. AMI
- B. MLT-3
- C. B8ZS
- D. HDB3

Answer: C

Q609. What is the relationship between bit rate and baud rate when using 8-PSK modulation?

- A. Bit rate = 8 * baud rate
- B. Bit rate = 3 * baud rate
- C. Bit rate = 2 * baud rate
- D. Bit rate = baud rate

Answer: B

Q610. In spread spectrum communication, what happens to the signal bandwidth compared to the original data bandwidth?

- A. It is halved exactly
- B. It decreases significantly
- C. It remains the same
- D. It increases significantly

Answer: D

Q611. In the OSI model, at which layer does the PDU (Protocol Data Unit) change from 'segment' to 'packet'?

- A. From Session to Transport layer
- B. From Transport to Network layer
- C. From Data Link to Physical layer
- D. From Network to Data Link layer

Answer: B

Q612. Which RFC defines the Internet Protocol version 4 (IPv4)?

- A. RFC 793
- B. RFC 791
- C. RFC 2460
- D. RFC 768

Answer: B

Q613. What problem does the Spanning Tree Protocol (STP) solve in switched networks?

- A. Domain name resolution failures
- B. Broadcast storms from switching loops
- C. Automatic IP address assignment
- D. Bandwidth allocation conflicts

Answer: B

Q614. In a hierarchical network design, what is the role of the distribution layer?

- A. Policy-based routing between access and core
- B. High-speed backbone packet forwarding
- C. Connecting end-user devices directly
- D. Providing wireless access to clients

Answer: A

Q615. What is the key concept behind Software-Defined Networking (SDN)?

- A. Hosting all networking functions in the cloud
- B. Eliminating all physical network device hardware
- C. Using only software-based routers for all traffic
- D. Separating the control plane from the data plane

Answer: D

Q616. What is the purpose of MPLS (Multi-Protocol Label Switching) in networking?

- A. To encrypt all network traffic end-to-end
- B. To provide wireless connectivity to devices
- C. To completely replace IP addressing schemes
- D. To speed up forwarding using labels not IPs

Answer: D

Q617. In network performance, what is jitter?

- A. Maximum throughput of a link
- B. Total time to deliver a message
- C. Loss of packets during transit
- D. Variation in packet arrival delay

Answer: D

Q618. What distinguishes a Layer 3 switch from a traditional router?

- A. It performs routing in hardware via ASICs
- B. It operates at a much higher OSI layer
- C. It cannot route between different VLANs
- D. It only works with wireless networks

Answer: A

Q619. In the context of Quality of Service (QoS), what does DiffServ provide?

- A. Guaranteed zero latency for all flows
- B. Per-flow resource reservation for traffic
- C. Automatic bandwidth doubling on demand
- D. Traffic classification using DSCP values

Answer: D

Q620. What is the main purpose of Network Function Virtualization (NFV)?

- A. To create virtual LAN segments on switches
- B. To create backup networks for failover
- C. To virtualize and manage IP address pools
- D. To replace hardware appliances with software

Answer: D

Q621. If the generator polynomial for CRC is $x^3 + 1$, what is the binary divisor?

- A. 1001
- B. 1101
- C. 1111
- D. 1011

Answer: A

Q622. In the HDLC protocol, what type of frame is used for flow and error control without carrying any data?

- A. U-frame
- B. P-frame
- C. I-frame
- D. S-frame

Answer: D

Q623. In a sliding window protocol with a window size of 7 and sequence numbers 0-7, what is the maximum sender window size in Go-Back-N?

- A. 7
- B. 8
- C. 3
- D. 4

Answer: A

Q624. What is the purpose of the IEEE 802.1Q tag in Ethernet frames?

- A. Quality of Service marking
- B. VLAN identification tagging
- C. Frame payload encryption
- D. Error correction coding

Answer: B

Q625. What is the maximum number of VLANs supported by IEEE 802.1Q?

- A. 65535
- B. 1024
- C. 4094
- D. 256

Answer: C

Q626. What is the Hamming distance needed to correct t errors?

- A. $2t$
- B. $t + 1$
- C. $2t + 1$
- D. t

Answer: C

Q627. In Ethernet, why is there a minimum frame size requirement of 64 bytes?

- A. To reduce processing overhead on devices
- B. To support VLAN tagging in the header
- C. To maintain backward compatibility with hubs
- D. To ensure collision detection within the network

Answer: D

Q628. What is the difference between persistent and non-persistent CSMA?

- A. There is no functional difference between the two modes
- B. Non-persistent is significantly faster than persistent always
- C. Persistent transmits when idle; non-persistent waits randomly before sensing
- D. Persistent CSMA relies on a token passing mechanism

Answer: C

Q629. In the PPP (Point-to-Point Protocol) frame, what is the role of the LCP (Link Control Protocol)?

- A. Establishing and maintaining the link
- B. Resolving domain names for hosts
- C. Assigning IP addresses to endpoints
- D. Routing packets across the network

Answer: A

Q630. CRC-32 used in Ethernet can detect all burst errors of length up to how many bits?

- A. 32
- B. 64
- C. 24
- D. 16

Answer: A

Q631. Given the IP address 172.16.45.14/21, what is the network address?

- A. 172.16.32.0
- B. 172.16.40.0
- C. 172.16.45.0
- D. 172.16.44.0

Answer: B

Q632. In OSPF, what is an Area Border Router (ABR)?

- A. A router that runs the BGP protocol
- B. A router operating within a single OSPF area
- C. A router connecting two or more OSPF areas
- D. A router connecting to external networks only

Answer: C

Q633. What technique does split horizon use to solve the count-to-infinity problem?

- A. Not advertising routes back through learned interfaces
- B. Using TTL values to limit the route propagation
- C. Sending updates to directly connected routers only
- D. Encrypting all routing update messages sent

Answer: A

Q634. In IPv6, what replaces broadcast?

- A. No replacement exists
- B. Multicast and anycast
- C. Unicast addressing
- D. Simplex mode

Answer: B

Q635. What is the purpose of the OSPF Designated Router (DR)?

- A. To connect to external autonomous systems
- B. To serve as the default gateway for hosts
- C. To handle DHCP requests from all clients
- D. To reduce adjacencies on multi-access networks

Answer: D

Q636. A company needs to create 6 subnets from a /24 network. What is the most efficient subnet mask to use?

- A. /29
- B. /26
- C. /28
- D. /27

Answer: D

Q637. What is the function of the Protocol field in the IPv4 header?

- A. To indicate the total length of the packet
- B. To identify the upper-layer protocol used
- C. To store the header checksum for errors
- D. To specify the version of IP being used

Answer: B

Q638. In BGP, what is the AS_PATH attribute used for?

- A. Listing traversed ASes to prevent loops
- B. Measuring the link bandwidth capacity
- C. Encrypting routing updates over links
- D. Assigning IP addresses to BGP peers

Answer: A

Q639. What is the main advantage of VLSM (Variable Length Subnet Masking)?

- A. It enables faster packet routing overall
- B. It simplifies network configuration greatly
- C. It provides better security for subnets
- D. It allows subnets of different sizes for efficiency

Answer: D

Q640. What is route aggregation (supernetting) and why is it important?

- A. Combining network prefixes to reduce routing tables
- B. Assigning multiple IP addresses to a single host
- C. Creating backup routes for network redundancy
- D. Splitting a network into smaller subnets for isolation

Answer: A

Q641. In TCP congestion control, what triggers the slow start algorithm to switch to congestion avoidance?

- A. When all sent data has been acknowledged
- B. When the receiver window fills up completely
- C. After a retransmission timeout event occurs
- D. When congestion window reaches the ssthresh

Answer: D

Q642. What happens in TCP fast retransmit?

- A. The sender waits for a timeout before resending
- B. All unacknowledged segments are retransmitted
- C. The receiver requests immediate retransmission
- D. The sender resends after three duplicate ACKs

Answer: D

Q643. In the TCP state diagram, what state does a client enter after sending a SYN?

- A. SYN_RECEIVED
- B. ESTABLISHED
- C. SYN_SENT
- D. LISTEN

Answer: C

Q644. What is the TIME_WAIT state in TCP used for?

- A. Waiting for lost data to be retransmitted
- B. Waiting for the server to respond to requests
- C. Performing the initial connection setup phase
- D. Ensuring old duplicate segments expire first

Answer: D

Q645. What is TCP SACK (Selective Acknowledgment)?

- A. A compression method for TCP segments
- B. An extension to report non-contiguous data blocks
- C. A method to acknowledge every single byte received
- D. A security feature for TCP authentication

Answer: B

Q646. What is the Silly Window Syndrome in TCP?

- A. A routing loop caused by TCP misconfiguration
- B. A security vulnerability in older TCP stacks
- C. A DNS resolution error affecting TCP connections
- D. Inefficient exchange of tiny segments due to small windows

Answer: D

Q647. In TCP Reno, what happens when three duplicate ACKs are received?

- A. The cwnd is reset to 1 MSS and slow start begins
- B. The TCP connection is terminated by the sender
- C. The cwnd is doubled and transmission continues
- D. The ssthresh is halved and fast recovery is entered

Answer: D

Q648. What is the purpose of the TCP PSH (Push) flag?

- A. To indicate urgent data in the stream
- B. To establish a new TCP connection
- C. To deliver buffered data to the app now
- D. To reset the existing TCP connection

Answer: C

Q649. What is a SYN flood attack?

- A. Sending many SYNs without completing handshakes
- B. Flooding the network with excessive UDP packets
- C. Sending too much data at once to overflow buffers
- D. Sending many malformed DNS query messages

Answer: A

Q650. What distinguishes QUIC from TCP?

- A. QUIC is only used for email protocols
- B. QUIC does not support stream multiplexing
- C. QUIC is slower but more reliable than TCP
- D. QUIC runs over UDP with built-in encryption

Answer: D

Q651. In DNS, what is a recursive query?

- A. A query where the server fully resolves the name
- B. A query that only checks local cache entries
- C. A query that returns only partial results
- D. A query that bypasses all DNS caches

Answer: A

Q652. What is the key improvement in HTTP/2 over HTTP/1.1?

- A. It uses UDP instead of TCP for speed
- B. It removes all encryption and TLS support
- C. It uses a completely different port number
- D. It multiplexes requests over a single connection

Answer: D

Q653. What is DNS amplification attack?

- A. Modifying DNS responses to redirect users
- B. Using open resolvers to flood a target with traffic
- C. Blocking all DNS queries on the network
- D. Stealing DNS records from name servers

Answer: B

Q654. What is the purpose of DNSSEC?

- A. To speed up DNS query resolution time
- B. To authenticate and verify DNS responses
- C. To encrypt DNS queries for user privacy
- D. To replace DNS with a new modern protocol

Answer: B

Q655. What is a RESTful API?

- A. An API that only supports GET requests
- B. An API using HTTP methods for stateless access
- C. An API that only works during off-peak hours
- D. An API built on SOAP protocol framework

Answer: B

Q656. What is DNS-over-HTTPS (DoH)?

- A. A new DNS record type for websites
- B. A faster version of DNS using caching
- C. A protocol encapsulating DNS within HTTPS
- D. A way to host DNS on web servers only

Answer: C

Q657. In HTTP, what is the purpose of the ETag header?

- A. Session management cookies
- B. Resource versioning for caching
- C. User authentication tokens
- D. Content encoding indicators

Answer: B

Q658. What is the function of a reverse proxy?

- A. To block all incoming network traffic
- B. To hide the client identity from servers
- C. To forward requests to backend servers
- D. To replace DNS resolution entirely

Answer: C

Q659. What is the purpose of a CDN (Content Delivery Network)?

- A. To encrypt emails during transit
- B. To replace web servers entirely
- C. To provide DNS resolution services
- D. To distribute content globally for speed

Answer: D

Q660. What is WebSocket and how does it differ from HTTP?

- A. WebSocket is only designed for file transfers
- B. WebSocket provides full-duplex persistent communication
- C. WebSocket uses UDP instead of TCP for transport
- D. WebSocket is a faster version of the HTTP protocol

Answer: B

Q661. What is beamforming in 5G and Wi-Fi 6?

- A. Using a single omnidirectional antenna only
- B. Focusing signal energy toward specific devices
- C. Broadcasting signals in all directions equally
- D. Reducing signal power to save energy

Answer: B

Q662. What is the key technology difference between 5G mmWave and sub-6 GHz 5G?

- A. Sub-6 GHz provides faster speeds than mmWave
- B. They are identical in performance and range
- C. mmWave offers extreme speed but limited range; sub-6 gives wider coverage
- D. mmWave has better penetration through buildings

Answer: C

Q663. What is MU-MIMO and how does it differ from SU-MIMO?

- A. They are the same MIMO technology in practice
- B. MU-MIMO uses fewer antennas than SU-MIMO does
- C. SU-MIMO is newer and more advanced than MU-MIMO
- D. MU-MIMO serves multiple users at once; SU-MIMO serves one

Answer: D

Q664. What is OFDMA and how does it improve Wi-Fi 6?

- A. A wireless security protocol for encryption
- B. A technique dividing channels into sub-channels for users
- C. A type of data encryption for Wi-Fi
- D. A new dedicated radio frequency band

Answer: B

Q665. What is network slicing in 5G?

- A. Creating virtual networks on shared infrastructure
- B. Reducing overall network speed for stability
- C. Dividing frequency bands into smaller chunks
- D. Physically cutting and splicing network cables

Answer: A

Q666. What is the exposed station problem in wireless networks?

- A. A station without any encryption configured on it
- B. A security vulnerability allowing eavesdropping attacks
- C. A station that unnecessarily defers its own transmission
- D. A station that is visible to all users on the network

Answer: C

Q667. In Wi-Fi 6 (802.11ax), what is BSS Coloring?

- A. Marking frames to differentiate overlapping BSSs
- B. Changing the LED color on the router hardware
- C. A security feature for frame encryption
- D. A QoS mechanism for traffic prioritization

Answer: A

Q668. What is the role of the Mobility Management Entity (MME) in LTE architecture?

- A. Radio signal transmission to devices
- B. Control-plane functions like auth and handover
- C. Forwarding user data between nodes
- D. Content delivery to mobile users

Answer: B

Q669. What is the KRACK (Key Reinstallation Attack) vulnerability?

- A. A DNS spoofing attack on wireless networks
- B. An attack exploiting the WPA2 four-way handshake
- C. A brute force password cracking technique
- D. A physical attack on router hardware devices

Answer: B

Q670. What is the purpose of Target Wake Time (TWT) in Wi-Fi 6?

- A. To increase the transmit power of antennas
- B. To keep all devices active and always on
- C. To change wireless channels automatically
- D. To schedule wake times to save device power

Answer: D

Q671. What is the CAP theorem in distributed cloud systems?

- A. A theorem about total network capacity limits
- B. A theorem about reducing cloud service costs
- C. A theorem about choosing two of three guarantees
- D. A theorem about CPU performance scaling

Answer: C

Q672. What is cloud-native architecture?

- A. Cloud storage solutions without compute services
- B. Applications designed for on-premises servers only
- C. Native mobile apps that run on phones only
- D. Apps built with microservices, containers, and CI/CD

Answer: D

Q673. What is the shared responsibility model in cloud security?

- A. Provider secures infrastructure; customer secures data
- B. The cloud provider handles all security alone
- C. No one is responsible for cloud security
- D. The customer handles all security responsibilities

Answer: A

Q674. What is Kubernetes?

- A. A container orchestration platform
- B. A programming language for cloud
- C. A cloud provider platform service
- D. A type of virtual machine image

Answer: A

Q675. What is edge computing and how does it relate to cloud computing?

- A. A complete replacement for cloud computing
- B. Processing data near the source to cut latency
- C. Computing at the edge of a physical desk
- D. Computing only on mobile phone devices

Answer: B

Q676. What is Infrastructure as Code (IaC)?

- A. Managing infrastructure via configuration files
- B. Coding without using a computer at all
- C. A type of cloud storage service
- D. Writing code directly on physical servers

Answer: A

Q677. What is vendor lock-in in cloud computing and how can it be mitigated?

- A. A security feature that protects cloud accounts
- B. Being locked out of a vendor's office building
- C. Dependency on one provider, mitigated by open standards
- D. A pricing model for reserved cloud instances

Answer: C

Q678. What is a cloud service mesh?

- A. A type of cloud object storage bucket
- B. An infrastructure layer for service communication
- C. Physical network cables in a cloud data center
- D. A wireless network within cloud data centers

Answer: B

Q679. What is the difference between disaster recovery (DR) and high availability (HA) in cloud?

- A. HA prevents downtime; DR recovers from disasters
- B. DR is always faster than HA to implement
- C. HA is only applicable to database services
- D. They are the same concept with different names

Answer: A

Q680. What is FinOps in the context of cloud computing?

- A. A cloud provider offering compute services
- B. A practice for managing cloud spending effectively
- C. Financial operations for stock market trading
- D. A type of encryption for financial data

Answer: B

Q681. What is the difference between IPSec tunnel mode and transport mode?

- A. Tunnel encrypts entire packet; transport encrypts payload only
- B. Transport mode encrypts the entire IP packet
- C. They are identical in operation and security
- D. Tunnel mode provides less security than transport

Answer: A

Q682. What is a zero-day vulnerability?

- A. A vulnerability that takes zero days to fix
- B. A vulnerability with zero security impact
- C. An unknown flaw exploited before a patch exists
- D. A vulnerability found on the software release day

Answer: C

Q683. What is the TLS 1.3 handshake improvement over TLS 1.2?

- A. It reduces handshake to 1-RTT with 0-RTT option
- B. It uses more round trips for security
- C. It removes all encryption for faster speed
- D. It uses significantly longer encryption keys

Answer: A

Q684. What is DNS cache poisoning?

- A. Physically destroying DNS server hardware
- B. Clearing the DNS cache on all resolvers
- C. A DNS backup and recovery method
- D. Injecting false DNS entries to redirect users

Answer: D

Q685. What is network segmentation and why is it important for security?

- A. Creating one large flat network for simplicity
- B. Dividing networks into segments to limit attacks
- C. A type of data encryption for networks
- D. Disconnecting all network cables physically

Answer: B

Q686. What is the principle of zero trust security?

- A. Having zero security measures on the network
- B. Trusting only traffic from external sources
- C. Trusting all internal network traffic by default
- D. Never trust, always verify every access request

Answer: D

Q687. What is the BGP hijacking attack?

- A. A DNS spoofing attack on name servers
- B. A wireless deauthentication attack
- C. Stealing physical router hardware devices
- D. Announcing unauthorized IP prefixes via BGP

Answer: D

Q688. What is the purpose of SIEM (Security Information and Event Management)?

- A. Optimizing network speed and performance
- B. Managing email systems for organizations
- C. Securing file transfers between servers
- D. Collecting and analyzing security events for threats

Answer: D

Q689. What is perfect forward secrecy (PFS) in cryptographic protocols?

- A. A type of network firewall technology
- B. Ensuring past sessions stay safe if keys leak
- C. Using the same encryption key forever
- D. A backup encryption method for storage

Answer: B

Q690. What is the difference between signature-based and anomaly-based intrusion detection?

- A. They are the same detection method
- B. Signature-based can detect brand new attacks
- C. Anomaly-based detection is less effective overall
- D. Signature matches known patterns; anomaly detects deviations

Answer: D

Q691. What is the concept of intent-based networking (IBN)?

- A. A fully manual network configuration approach
- B. Admins define outcomes and the system auto-configures
- C. Networking based only on user browsing intentions
- D. A type of routing protocol for WANs

Answer: B

Q692. What is Segment Routing (SR) and why is it important for next-gen networks?

- A. DNS-based routing for domain resolution
- B. A type of firewall filtering technique
- C. Routing through physical cable segments only
- D. Source routing using segment lists to simplify forwarding

Answer: D

Q693. What is the role of AI/ML in next-generation network management?

- A. Only powering customer service chatbot systems
- B. Creating virtual network topologies from scratch
- C. Replacing all network hardware with software
- D. Enabling predictive analytics and self-healing networks

Answer: D

Q694. What is the concept of network disaggregation?

- A. Breaking network cables into smaller pieces
- B. Separating network hardware from software layers
- C. A type of encryption for network traffic
- D. Combining all network functions into one box

Answer: B

Q695. What is the P4 programming language used for in networking?

- A. Web development and frontend design
- B. Database management and SQL queries
- C. Cloud computing resource provisioning
- D. Programming how devices process packets

Answer: D

Q696. What is Quantum Key Distribution (QKD) in the context of next-gen network security?

- A. Distributing physical keys by courier
- B. A cloud service for key management
- C. A type of VPN tunnel technology
- D. Using quantum mechanics for provably secure keys

Answer: D

Q697. What is Time-Sensitive Networking (TSN) and which industries benefit from it?

- A. A wireless protocol for mobile devices only
- B. IEEE standards for deterministic Ethernet communication
- C. A faster version of standard Ethernet protocol
- D. A cloud service for time synchronization

Answer: B

Q698. What is the concept of network as a service (NaaS)?

- A. Free networking for all users
- B. Networking infrastructure provided on-demand as a service
- C. A programming language for networks
- D. A type of physical network router

Answer: B

Q699. What is the significance of Open RAN (O-RAN) in 5G networks?

- A. Disaggregating RAN with open interfaces for interop
- B. A security protocol for radio access
- C. A new radio frequency band for 5G
- D. A type of antenna for signal boosting

Answer: A

Q700. What is the concept of self-organizing networks (SON) in mobile communications?

- A. A manual configuration tool for base stations
- B. A type of routing protocol for mobile data
- C. Networks that physically rearrange themselves
- D. Networks that auto-configure, optimize, and self-heal

Answer: D

Q701. A noiseless channel has 5 kHz bandwidth and uses 16 signal levels. What is the maximum data rate per Nyquist?

- A. 80,000 bps
- B. 40,000 bps
- C. 20,000 bps
- D. 60,000 bps

Answer: B

Q702. In 64-QAM, how many bits are represented by each signal element?

- A. 6 bits per element
- B. 8 bits per element
- C. 4 bits per element
- D. 5 bits per element

Answer: A

Q703. What is the primary limitation of increasing signal levels to boost data rate?

- A. It increases the physical size of transmitters
- B. It makes the receiver more susceptible to noise
- C. It reduces the frequency of carrier signals
- D. It requires longer transmission cables overall

Answer: B

Q704. A signal has a power of 50 mW and noise power of 5 uW. What is the SNR in decibels?

- A. 30 dB
- B. 20 dB
- C. 40 dB
- D. 50 dB

Answer: C

Q705. In spread spectrum communication, what is the purpose of the chipping code?

- A. It compresses data to reduce bandwidth usage
- B. It encrypts data using symmetric key algorithms
- C. It corrects errors in received data automatically
- D. It spreads the signal across a wider frequency band

Answer: D

Q706. Why does frequency hopping spread spectrum (FHSS) change frequencies during transmission?

- A. To increase the overall data throughput rate
- B. To reduce power consumption at the transmitter
- C. To synchronize timing between sender and receiver
- D. To avoid prolonged interference on any one band

Answer: D

Q707. What is the impact of jitter on real-time data communication applications?

- A. It causes variation in packet arrival times
- B. It reduces the overall power consumption
- C. It increases the bandwidth of the channel
- D. It permanently corrupts all transmitted data

Answer: A

Q708. In PCM, what determines the number of quantization levels?

- A. The carrier frequency of the channel used
- B. The sampling rate of the analog signal
- C. The number of bits per sample allocated
- D. The bandwidth of the transmission medium

Answer: C

Q709. What is quantization noise and when does it become significant?

- A. Distortion from using excessively long fiber optic cables
- B. Interference caused by adjacent frequency band signals
- C. Noise from power supply fluctuations in the transmitter
- D. Error introduced by rounding analog values to discrete levels

Answer: D

Q710. How does OFDM improve data transmission in broadband systems?

- A. By amplifying signal power at regular interval points
- B. By splitting data across many orthogonal subcarriers
- C. By compressing data before modulation on the channel
- D. By using a single high-frequency carrier for all data

Answer: B

Q711. In a hierarchical network design, what is the function of the distribution layer?

- A. It enforces policies, filtering, and inter-VLAN routing
- B. It provides high-speed backbone connectivity between sites
- C. It manages wireless access points and mobile devices
- D. It connects end-user devices to the network directly

Answer: A

Q712. What problem does the Spanning Tree Protocol (STP) solve?

- A. It prevents IP address conflicts on the network
- B. It encrypts data flowing between network switches
- C. It eliminates broadcast storms from Layer 2 loops
- D. It balances traffic load across multiple gateways

Answer: C

Q713. How does software-defined networking (SDN) differ from traditional networking?

- A. SDN eliminates the need for any network protocols
- B. SDN separates the control plane from the data plane
- C. SDN replaces switches with direct cable connections
- D. SDN uses only wireless media for all communication

Answer: B

Q714. What is the purpose of MPLS in modern networks?

- A. To assign MAC addresses to network interfaces dynamically
- B. To encrypt all traffic between two endpoint routers
- C. To translate domain names into corresponding IP addresses
- D. To label packets for fast forwarding along predefined paths

Answer: D

Q715. In the context of QoS, what is traffic shaping?

- A. Controlling the rate of outgoing traffic for compliance
- B. Compressing packets to reduce overall bandwidth usage
- C. Physically rerouting cables for optimal signal paths
- D. Encrypting traffic to prevent unauthorized access

Answer: A

Q716. What is the role of an autonomous system (AS) in internet routing?

- A. A device that converts between IPv4 and IPv6 addresses
- B. A protocol for encrypting data across network boundaries
- C. A collection of routers under a single administrative policy
- D. A single router that manages all global internet traffic

Answer: C

Q717. How does network function virtualization (NFV) reduce costs?

- A. By removing the need for IP addressing in modern networks
- B. By replacing dedicated hardware with software on commodity servers
- C. By eliminating all network cables and using wireless only
- D. By using a single protocol for all communication types

Answer: B

Q718. What is the convergence time of a routing protocol?

- A. The interval between consecutive routing table backups
- B. The time taken to encrypt all routing table entries
- C. The delay between sending and receiving a single packet
- D. The time for all routers to agree on the network topology

Answer: D

Q719. What is the primary advantage of intent-based networking (IBN)?

- A. It allows network configuration through business intent policies
- B. It eliminates security threats through hardware isolation
- C. It provides unlimited bandwidth to all connected devices
- D. It removes the need for switches and routers entirely

Answer: A

Q720. How does segment routing simplify traffic engineering in networks?

- A. By physically segmenting the network into isolated zones
- B. By compressing routing tables to reduce memory usage
- C. By encrypting each packet segment individually for security
- D. By encoding the forwarding path in the packet header itself

Answer: D

Q721. In Go-Back-N with a window size of 7, what is the minimum number of sequence number bits needed?

- A. 3 bits
- B. 5 bits
- C. 4 bits
- D. 2 bits

Answer: A

Q722. Why can't the window size in Go-Back-N equal the sequence number space?

- A. The sender buffer would overflow causing system failures
- B. The receiver could confuse new frames with retransmissions
- C. It would exceed the maximum transmission unit size limit
- D. It would require more bandwidth than the link can handle

Answer: B

Q723. What is the maximum efficiency of pure ALOHA protocol?

- A. 12.5 percent
- B. 36.8 percent
- C. 18.4 percent
- D. 50.0 percent

Answer: C

Q724. How does slotted ALOHA improve over pure ALOHA?

- A. It doubles throughput by restricting starts to time slots
- B. It uses frequency division to separate all transmissions
- C. It eliminates collisions entirely through token passing
- D. It compresses frames to reduce the chance of overlap

Answer: A

Q725. In Selective Repeat, what is the maximum window size for n-bit sequence numbers?

- A. $2^{(n+1)}$
- B. $2^{(n-1)}$
- C. 2^n minus one
- D. 2^n

Answer: B

Q726. What problem does the hidden terminal issue cause in wireless LANs?

- A. The access point fails to detect any transmitted frames
- B. All devices on the network lose their IP configurations
- C. Encrypted frames are decrypted by unauthorized receivers
- D. Two stations that cannot hear each other collide at the AP

Answer: D

Q727. How does the RTS/CTS mechanism address the hidden terminal problem?

- A. By reserving the channel before data frame transmission
- B. By increasing transmission power to reach all stations
- C. By encrypting frames to prevent unauthorized decoding
- D. By assigning fixed frequencies to each wireless device

Answer: A

Q728. What is the minimum frame size requirement in standard Ethernet and why?

- A. 256 bytes, to guarantee sufficient error correction data space
- B. 64 bytes, to ensure collision detection before transmission ends
- C. 32 bytes, to maintain compatibility with token ring networks
- D. 128 bytes, to provide enough space for header and payload

Answer: B

Q729. What is the difference between persistent and non-persistent CSMA?

- A. Persistent CSMA continuously monitors; non-persistent waits randomly
- B. Persistent CSMA encrypts data; non-persistent sends it plainly
- C. Persistent CSMA uses tokens; non-persistent uses frequency slots
- D. Persistent CSMA is wireless only; non-persistent is wired only

Answer: A

Q730. How does 802.1Q VLAN tagging modify an Ethernet frame?

- A. It appends VLAN information after the frame check sequence
- B. It changes the preamble to include VLAN routing information
- C. It replaces the destination MAC address with a VLAN identifier
- D. It inserts a 4-byte tag between source MAC and type field

Answer: D

Q731. Given the IP address 172.16.45.0/26, how many usable host addresses are available?

- A. 64 hosts
- B. 126 hosts
- C. 62 hosts
- D. 30 hosts

Answer: C

Q732. What is the purpose of route summarization (supernetting)?

- A. It assigns additional IP addresses to overloaded subnets
- B. It combines multiple smaller routes into a single entry
- C. It splits a large route into more specific smaller routes
- D. It encrypts routing updates between adjacent routers

Answer: B

Q733. How does BGP differ from OSPF in terms of routing scope?

- A. BGP and OSPF both operate only within a single AS domain
- B. BGP handles inter-AS routing; OSPF is for intra-AS routing
- C. BGP is for LANs only; OSPF is for WANs exclusively used
- D. BGP is for intra-AS routing; OSPF handles inter-AS routing

Answer: B

Q734. What is the role of the Protocol field in the IPv4 header?

- A. It identifies which transport layer protocol is encapsulated
- B. It contains the checksum for the IP header verification
- C. It indicates the total number of fragments for this packet
- D. It specifies the version of IP being used for routing

Answer: A

Q735. What mechanism does OSPF use to handle large networks efficiently?

- A. It uses only static routes for all network destinations
- B. It limits the number of routers to 50 per network
- C. It compresses all LSAs into a single combined broadcast
- D. It divides the network into areas with Area 0 backbone

Answer: D

Q736. In IPv6, what is the purpose of the flow label field?

- A. It identifies packets belonging to the same traffic flow
- B. It stores the source and destination MAC addresses
- C. It contains the fragment offset for reassembly process
- D. It specifies the maximum hop limit for the IP packet

Answer: A

Q737. How does Anycast addressing work in IPv6?

- A. It delivers packets to the nearest device in a group
- B. It assigns unique addresses to every network interface
- C. It sends packets to all devices in the network at once
- D. It translates IPv4 addresses to IPv6 format directly

Answer: A

Q738. What is the tunneling technique used for IPv6 transition?

- A. It encapsulates IPv6 packets inside IPv4 packets for transit
- B. It drops IPv6 packets when they reach an IPv4 only network
- C. It converts IPv6 addresses into compatible IPv4 addresses
- D. It replaces all IPv4 routers with IPv6 routers instantly

Answer: A

Q739. What is the purpose of ECMP (Equal-Cost Multi-Path) routing?

- A. It assigns different costs to each available network path
- B. It encrypts traffic flowing across multiple network paths
- C. It selects the single lowest cost path for all packets
- D. It distributes traffic across multiple equal-cost routes

Answer: D

Q740. How does Path MTU Discovery work in IP networking?

- A. It finds the smallest MTU along the path to avoid fragmentation
- B. It measures the total bandwidth available on the route
- C. It identifies all routers along the path using ICMP requests
- D. It discovers the fastest path between source and receiver

Answer: A

Q741. How does TCP Reno handle packet loss detection through triple duplicate ACKs?

- A. It halves the congestion window and enters fast recovery phase
- B. It resets the congestion window to one segment immediately
- C. It doubles the congestion window to recover lost bandwidth
- D. It closes the connection and re-establishes a new session

Answer: A

Q742. What is the silly window syndrome in TCP?

- A. When tiny amounts of data are exchanged very inefficiently
- B. When large segments are sent through low bandwidth links
- C. When DNS resolution takes excessively long to complete
- D. When the routing table contains incorrect gateway entries

Answer: A

Q743. What is the purpose of TCP SACK (Selective Acknowledgment)?

- A. It encrypts acknowledgments to prevent spoofing attacks
- B. It selects which port number to use for the connection
- C. It allows the receiver to report non-contiguous blocks received
- D. It aggregates multiple acknowledgments into a single message

Answer: C

Q744. How does TCP handle the TIME_WAIT state after connection close?

- A. It sends additional data segments to flush the pipeline
- B. It immediately releases all resources for the connection
- C. It waits for 2x MSL to ensure all packets are delivered
- D. It resets the sequence numbers for the next connection

Answer: C

Q745. What is the TCP slow start threshold (ssthresh) used for?

- A. It sets the minimum segment size for transmission allowed
- B. It defines the timeout period for retransmission of lost segments
- C. It determines when to switch from slow start to congestion avoidance
- D. It limits the maximum number of simultaneous TCP connections

Answer: C

Q746. What problem does TCP head-of-line blocking cause?

- A. It prevents new connections from being established on server
- B. A lost segment delays delivery of all subsequent segments
- C. It blocks DNS resolution until the TCP connection times out
- D. It causes the routing table to become incorrectly populated

Answer: B

Q747. How does QUIC (used in HTTP/3) improve over TCP+TLS?

- A. It replaces IP addressing with a new addressing scheme used
- B. It uses larger packet sizes for higher throughput overall
- C. It combines transport and encryption in fewer round trips
- D. It eliminates the need for any congestion control mechanism

Answer: C

Q748. What is the purpose of ECN (Explicit Congestion Notification)?

- A. To notify applications when their port number is in use
- B. To signal congestion without dropping packets at the router
- C. To extend the congestion window beyond its normal limits
- D. To encrypt traffic flowing through congested network links

Answer: B

Q749. What is the difference between TCP Tahoe and TCP Reno on timeout?

- A. Tahoe uses fast recovery; Reno resets cwnd to one segment
- B. Both reset cwnd to one on timeout, Reno adds fast recovery for dup ACKs
- C. Reno uses slow start only; Tahoe uses congestion avoidance only
- D. Tahoe closes the connection; Reno continues transmitting data

Answer: B

Q750. What is Multipath TCP (MPTCP) designed to achieve?

- A. To reduce the MTU size for faster processing by routers
- B. To encrypt multiple TCP streams using a single shared key
- C. To use multiple network paths for a single TCP connection
- D. To create multiple connections using a single source port

Answer: C

Q751. What is DNS amplification attack and how does it work?

- A. Attacker spoofs the victim's IP and sends small queries to get large replies
- B. Attacker overwhelms DNS servers by sending millions of registration requests
- C. Attacker intercepts DNS responses and replaces them with false information
- D. Attacker modifies DNS cache entries to redirect users to malicious websites

Answer: A

Q752. What is the purpose of DNSSEC (DNS Security Extensions)?

- A. It filters malicious domain names from DNS resolution
- B. It replaces DNS with a more secure naming system entirely
- C. It encrypts all DNS query and response traffic end-to-end
- D. It authenticates DNS responses using digital signatures

Answer: D

Q753. How does HTTP/2 improve performance over HTTP/1.1?

- A. It multiplexes multiple requests over a single connection
- B. It uses a text-based protocol for easier debugging
- C. It increases the maximum URL length for complex queries
- D. It eliminates the need for TLS encryption on all connections

Answer: A

Q754. What is the CAP theorem in distributed application systems?

- A. A system must choose between Caching, Addressing, and Protocol compatibility
- B. A system can have Compression, Authentication, and Performance simultaneously
- C. A system balances Concurrency, Atomicity, and Persistence for transactions
- D. A system can guarantee only two of Consistency, Availability, and Partition tolerance

Answer: D

Q755. What is the purpose of WebSocket protocol?

- A. It provides a new addressing scheme for web-based resources
- B. It enables full-duplex communication over a single TCP connection
- C. It replaces HTTP entirely for all web communications now
- D. It compresses static web content for faster initial page loads

Answer: B

Q756. What is the difference between gRPC and REST APIs?

- A. gRPC works without any network; REST requires internet connectivity
- B. gRPC uses Protocol Buffers and HTTP/2; REST uses JSON and HTTP/1.1 typically
- C. gRPC is only for web browsers; REST is for all client applications
- D. gRPC uses XML encoding; REST uses binary serialization for data

Answer: B

Q757. How does DNS over HTTPS (DoH) improve privacy?

- A. It stores DNS records locally to avoid network queries
- B. It blocks all tracking cookies from websites visited
- C. It encrypts DNS queries within HTTPS to prevent snooping
- D. It anonymizes the user's IP address from DNS servers

Answer: C

Q758. What is the purpose of HSTS (HTTP Strict Transport Security)?

- A. It blocks HTTP traffic from reaching the web server entirely
- B. It compresses HTTPS traffic for faster encrypted page loads
- C. It generates SSL certificates automatically for all domains
- D. It forces browsers to always use HTTPS for a specific domain

Answer: D

Q759. What is GraphQL's main advantage over traditional REST APIs?

- A. It eliminates the need for a database on the server backend
- B. It automatically encrypts all data exchanged between nodes
- C. It provides built-in authentication for all API endpoints
- D. It allows clients to request exactly the data fields they need

Answer: D

Q760. What is the role of service mesh in microservices architecture?

- A. It manages inter-service communication, observability, and security
- B. It provides a physical network topology for container hosting
- C. It stores persistent data shared across all microservice nodes
- D. It replaces all application code with auto-generated services

Answer: A

Q761. What is the KRACK attack on WPA2 wireless networks?

- A. It exploits the four-way handshake to reinstall encryption keys
- B. It jams the wireless frequency to deny service to all users
- C. It brute-forces the WiFi password using parallel computing
- D. It clones the access point to create a fake network nearby

Answer: A

Q762. How does Massive MIMO differ from conventional MIMO systems?

- A. It uses a single antenna instead of multiple antenna arrays
- B. It employs hundreds of antennas at the base station for capacity
- C. It eliminates the need for any digital signal processing steps
- D. It operates exclusively in the sub-1 GHz frequency band range

Answer: B

Q763. What is the purpose of network slicing in 5G networks?

- A. It splits the frequency spectrum into equal fixed portions
- B. It creates virtual networks tailored to specific use cases
- C. It physically divides the antenna into separate segments
- D. It reduces the cell tower height for urban deployments

Answer: B

Q764. What is the near-far problem in wireless CDMA systems?

- A. A strong nearby signal overwhelms weaker signals from far users
- B. Near users experience more interference than far away users
- C. Distant users are unable to connect to any base station
- D. The antenna cannot distinguish between near and far frequencies

Answer: A

Q765. What is the role of the EPC (Evolved Packet Core) in LTE?

- A. It provides power supply management for all base stations
- B. It manages the physical radio transmission between towers
- C. It controls the display settings on mobile user devices
- D. It handles core network functions like authentication and routing

Answer: D

Q766. How does carrier aggregation improve LTE-Advanced performance?

- A. It compresses data before transmission to save bandwidth space
- B. It reduces the number of connected devices to improve speed
- C. It combines multiple frequency bands for greater total bandwidth
- D. It increases the transmission power of the base station antenna

Answer: C

Q767. What is the purpose of the BSS color field in WiFi 6?

- A. It identifies the color scheme for network management GUIs
- B. It determines the physical location of each connected device
- C. It assigns priority levels based on the device manufacturer
- D. It distinguishes overlapping BSSs to reduce co-channel interference

Answer: D

Q768. What is the main challenge of millimeter wave (mmWave) in 5G?

- A. It provides extremely low data rates unsuitable for broadband
- B. It has very limited range and is easily blocked by obstacles
- C. It only works in underwater communication environments now
- D. It requires excessively large antennas that are impractical

Answer: B

Q769. What is Device-to-Device (D2D) communication in LTE/5G?

- A. Communication between two base stations without user devices
- B. Transfer of device configuration settings during factory reset process
- C. Communication between a device and its cloud backup storage server
- D. Direct communication between nearby devices without base station relay

Answer: D

Q770. How does full-duplex wireless communication differ from current systems?

- A. It uses two separate antennas for upload and download traffic
- B. It doubles the frequency band allocation for each user device
- C. It transmits and receives on the same frequency simultaneously
- D. It alternates between transmission and reception at high speed

Answer: C

Q771. What is the purpose of Kubernetes in cloud-native architectures?

- A. It orchestrates deployment, scaling, and management of containers
- B. It provides virtual machine hypervisor management for data centers
- C. It encrypts all network traffic between microservices automatically
- D. It replaces traditional databases with distributed file storage

Answer: A

Q772. What is the concept of immutable infrastructure in cloud?

- A. Infrastructure that is immune to all security vulnerabilities
- B. Hardware that never needs physical maintenance or replacement
- C. Infrastructure that cannot be modified after initial deployment
- D. Servers that automatically update their own operating systems

Answer: C

Q773. What is a service level agreement (SLA) in cloud computing?

- A. A software license for cloud application source code access
- B. A network protocol for secure cloud data transfer operations
- C. A contract defining guaranteed performance and uptime metrics
- D. A hardware specification for physical cloud server components

Answer: C

Q774. How does a cloud-native application differ from a traditional application?

- A. It requires manual scaling and dedicated hardware for deployment
- B. It uses monolithic architecture deployed on single physical servers
- C. It runs only on desktop computers without internet access
- D. It is designed for cloud environments using microservices and containers

Answer: D

Q775. What is the purpose of Infrastructure as Code (IaC)?

- A. Managing and provisioning infrastructure through code and templates
- B. Writing application code that runs on cloud infrastructure
- C. Converting physical servers into virtual machines automatically
- D. Encoding network traffic for secure cloud communication links

Answer: A

Q776. What is cloud bursting and when is it used?

- A. When data is deleted from cloud storage due to inactivity timeout
- B. When multiple cloud providers merge their resources into one pool
- C. When a cloud server physically overheats and shuts itself down
- D. When private cloud overflows workloads to public cloud during peaks

Answer: D

Q777. What is the purpose of a chaos engineering approach in cloud?

- A. To overload systems deliberately to find performance limits
- B. To randomly generate test data for application benchmarking
- C. To create confusing network topologies that test admin skills
- D. To intentionally introduce failures and test system resilience

Answer: D

Q778. What is the difference between cloud-native and cloud-enabled applications?

- A. Cloud-native is less scalable; cloud-enabled offers better performance
- B. Cloud-native is built for cloud; cloud-enabled is migrated legacy apps
- C. Cloud-native uses containers; cloud-enabled uses only virtual machines
- D. Cloud-native requires bare metal; cloud-enabled works on any platform

Answer: B

Q779. What is edge computing and how does it relate to cloud?

- A. It replaces cloud computing entirely with local device processing
- B. It stores all data at the center of the cloud data center only
- C. It processes data at the network edge, reducing latency to cloud
- D. It encrypts data at the boundary of the corporate network only

Answer: C

Q780. What is the FinOps framework in cloud computing?

- A. A financial auditing tool for cloud provider tax compliance
- B. A protocol for encrypting financial transactions in the cloud
- C. A cloud-based accounting software for small business finance
- D. A practice for managing cloud costs through collaboration and data

Answer: D

Q781. What is a zero-day vulnerability?

- A. A security issue that affects zero users in the network
- B. A bug that was fixed exactly zero days after discovery
- C. A vulnerability that only exists for zero days before expiring
- D. A flaw exploited before the vendor has released any patch

Answer: D

Q782. How does IPSec provide security at the network layer?

- A. It replaces IP addresses with encrypted identifiers in headers
- B. It filters packets based on source and destination IP only
- C. It blocks all ICMP traffic to prevent network reconnaissance
- D. It encrypts and authenticates IP packets using AH and ESP

Answer: D

Q783. What is the purpose of a honeypot in network security?

- A. It provides backup power to critical network infrastructure
- B. It distributes network traffic across multiple security zones
- C. It encrypts sensitive data stored on production file servers
- D. It acts as a decoy system to attract and study attackers

Answer: D

Q784. What is the Diffie-Hellman key exchange used for?

- A. It securely establishes a shared secret over an insecure channel
- B. It authenticates users using their biometric data remotely
- C. It compresses public keys for efficient network transmission
- D. It encrypts stored files on shared network drives securely

Answer: A

Q785. What is ARP spoofing and what can it enable?

- A. It intercepts DHCP requests to assign wrong IP addresses
- B. It floods the network with fake ARP requests for DoS attacks
- C. It modifies DNS records to redirect traffic to malicious sites
- D. It sends fake ARP replies to link attacker's MAC to victim's IP

Answer: D

Q786. What is the purpose of certificate pinning in mobile apps?

- A. It creates a backup copy of the server certificate on device
- B. It pins certificate files to email attachments for verification
- C. It stores certificates locally to work offline without network
- D. It restricts which certificates are trusted for a specific domain

Answer: D

Q787. What is the concept of zero trust security architecture?

- A. It never trusts and always verifies every access request made
- B. It trusts all internal network traffic without verification
- C. It grants permanent access after initial identity verification
- D. It removes all firewalls to simplify the network architecture

Answer: A

Q788. How does a SYN flood attack exploit the TCP handshake?

- A. It sends many SYN requests without completing the handshake
- B. It completes thousands of handshakes to exhaust server memory
- C. It modifies the SYN packet to inject malicious code payloads
- D. It intercepts SYN-ACK packets to steal session credentials

Answer: A

Q789. What is the role of SIEM in enterprise security?

- A. It provides physical access control for server room facilities
- B. It encrypts all stored data across the enterprise network
- C. It replaces firewalls with software-defined security boundaries
- D. It aggregates and analyzes security events from multiple sources

Answer: D

Q790. What is perfect forward secrecy (PFS) in TLS?

- A. It ensures past sessions cannot be decrypted if long-term key leaks
- B. It guarantees that no data will ever be lost in transit
- C. It provides unlimited bandwidth for encrypted network connections
- D. It permanently stores encryption keys for future session recovery

Answer: A

Q791. What is the concept of network disaggregation?

- A. Separating network hardware from software for vendor flexibility
- B. Dividing the network into smaller broadcast domains only
- C. Removing all redundant paths from the network topology
- D. Combining all network functions into a single proprietary box

Answer: A

Q792. How does quantum key distribution (QKD) enhance security?

- A. It replaces all digital certificates with quantum identifiers
- B. It generates longer passwords using quantum random number math
- C. It encrypts data using the physical properties of fiber optics
- D. It uses quantum mechanics to create unbreakable encryption keys

Answer: D

Q793. What is deterministic networking and why is it important?

- A. Networks that randomly route traffic for load balancing
- B. Networks that only operate during predetermined time windows
- C. Networks that determine user identity before allowing access
- D. Networks guaranteeing bounded latency and zero packet loss

Answer: D

Q794. What is the purpose of a digital twin network (DTN)?

- A. A second physical network installed for disaster recovery
- B. A virtual model of a network for simulation and optimization
- C. A backup network that activates when the primary fails
- D. A network that only carries duplicated data for redundancy

Answer: B

Q795. What challenges does post-quantum cryptography aim to address?

- A. The high cost of managing digital certificates across networks
- B. The latency introduced by current encryption and decryption steps
- C. The threat of quantum computers breaking current encryption methods
- D. The difficulty of implementing encryption on IoT sensor devices

Answer: C

Q796. What is the concept of programmable data planes in next-gen networks?

- A. Data planes that can be programmed by end users directly
- B. Network connections that adjust their physical medium dynamically
- C. Data storage planes that automatically organize stored data files
- D. Network hardware whose packet processing logic can be defined in code

Answer: D

Q797. How does federated learning benefit network intelligence?

- A. It centralizes all data in one location for faster processing
- B. It federates multiple networks into one large unified network
- C. It trains AI models across distributed nodes without sharing raw data
- D. It distributes stored data evenly across all network node devices

Answer: C

Q798. What is the role of SASE in next-generation enterprise networking?

- A. It provides physical security for enterprise server room access
- B. It replaces all enterprise applications with cloud alternatives
- C. It separates network management from security administration
- D. It converges networking and security into a unified cloud service

Answer: D

Q799. What is the concept of computing continuum from cloud to edge?

- A. A method of continuously compressing data as it crosses network
- B. A single massive computer that handles all processing tasks
- C. A seamless spectrum of computing resources from cloud to device
- D. A continuous network connection that never drops under any load

Answer: C

Q800. How does 6G envision advancing beyond 5G capabilities?

- A. By eliminating all wireless communication in favor of wired only
- B. By reducing network speeds to improve reliability and coverage
- C. By providing terahertz frequencies, AI integration, and sensing abilities
- D. By using only ground-based infrastructure without any satellites

Answer: C

Q801. In a 256-QAM modulation scheme, how many bits does each symbol carry?

- A. 10 bits per symbol in the constellation
- B. 8 bits per symbol in the constellation
- C. 12 bits per symbol in the constellation
- D. 6 bits per symbol in the constellation

Answer: B

Q802. A noisy channel has a bandwidth of 3 kHz and SNR of 127. What is the Shannon capacity?

- A. 35 kbps maximum capacity
- B. 28 kbps maximum capacity
- C. 14 kbps maximum capacity
- D. 21 kbps maximum capacity

Answer: D

Q803. What is the fundamental problem with unipolar NRZ encoding for long data streams?

- A. It consumes excessive bandwidth per symbol
- B. It cannot operate above 1 Mbps data rates
- C. It introduces a DC component causing baseline wander
- D. It requires complex decoding circuitry at receivers

Answer: C

Q804. In Direct Sequence Spread Spectrum (DSSS), what determines the spreading factor?

- A. The ratio of chip rate to data bit rate in the system
- B. The number of time slots available in each frame period
- C. The amplitude variation range of the modulated signal
- D. The number of frequency hops per second in the pattern

Answer: A

Q805. Why is the Shannon limit considered a theoretical upper bound for channel capacity?

- A. It assumes error-free coding with infinite complexity at the encoder
- B. It assumes zero latency in all signal processing hardware stages
- C. It assumes synchronous clocking across all connected network nodes
- D. It assumes ideal filtering with zero guard bands between channels

Answer: A

Q806. What distinguishes Differential Phase Shift Keying (DPSK) from conventional PSK?

- A. DPSK requires a coherent carrier reference at the receiver
- B. DPSK uses amplitude changes instead of phase changes
- C. DPSK operates at double the frequency of conventional PSK
- D. DPSK encodes data as changes between consecutive phase values

Answer: D

Q807. What is the Nyquist bandwidth for a channel carrying a signal with a baud rate of 10,000 symbols/s?

- A. 10 kHz minimum channel bandwidth
- B. 5 kHz minimum channel bandwidth
- C. 20 kHz minimum channel bandwidth
- D. 15 kHz minimum channel bandwidth

Answer: B

Q808. In CDMA, what happens when a receiver multiplies a received composite signal by a station's chip sequence?

- A. It amplifies signals from all stations equally for decoding
- B. It compresses the composite signal to reduce overall bandwidth
- C. It filters out the target station's data by orthogonal separation
- D. It encrypts the signal with the station's unique security key

Answer: C

Q809. What is the main advantage of OFDM over single-carrier modulation in wideband channels?

- A. OFDM eliminates the need for error correction coding entirely
- B. OFDM is resilient to multipath fading by using parallel subcarriers
- C. OFDM doubles the available spectrum through signal compression
- D. OFDM reduces transmitter power consumption significantly

Answer: B

Q810. A PCM system samples a signal at 16,000 samples/s using 12-bit quantization. What is the resulting data rate?

- A. 128 kbps output data stream
- B. 224 kbps output data stream
- C. 192 kbps output data stream
- D. 160 kbps output data stream

Answer: C

Q811. What is the primary purpose of the Rapid Spanning Tree Protocol (RSTP) over STP?

- A. RSTP enables routing capabilities within Layer 2 switch devices
- B. RSTP provides significantly faster convergence after topology changes
- C. RSTP supports more VLANs per switch than standard STP protocol
- D. RSTP eliminates the need for root bridge election in networks

Answer: B

Q812. In the context of SDN, what is the function of the southbound API?

- A. It enables communication between the controller and network devices
- B. It provides network analytics to management applications
- C. It connects external applications to the SDN controller layer
- D. It manages user authentication for the SDN control plane

Answer: A

Q813. What is the purpose of ECMP (Equal-Cost Multi-Path) in network design?

- A. To encrypt multiple paths for secure data delivery
- B. To create backup paths that activate only during failure
- C. To distribute traffic across multiple equal-cost routes
- D. To select the single lowest-cost path and block others

Answer: C

Q814. What is a fabric network architecture in data center design?

- A. A legacy three-tier design using core, distribution, and access layers
- B. A bus topology where all servers share a single backbone cable
- C. A ring-based topology connecting servers in a circular pattern
- D. A flat, scalable topology using spine-and-leaf switch arrangement

Answer: D

Q815. What is control plane policing (CoPP) used for in network infrastructure?

- A. To protect the router's control plane from excessive traffic
- B. To prioritize user data traffic over management traffic
- C. To balance routing protocol traffic across multiple interfaces
- D. To encrypt all control plane communications between routers

Answer: A

Q816. What is the difference between in-band and out-of-band network management?

- A. In-band management works only for wired networks and out-of-band only for wireless
- B. In-band uses production network paths while out-of-band uses dedicated management channels
- C. Out-of-band uses production network paths while in-band uses dedicated management channels
- D. Out-of-band management requires specialized hardware while in-band uses standard NICs

Answer: B

Q817. What is the purpose of BFD (Bidirectional Forwarding Detection) in networks?

- A. To authenticate routing protocol messages between peer routers
- B. To encrypt bidirectional traffic between two network devices
- C. To balance network traffic bidirectionally across redundant paths
- D. To provide rapid failure detection between adjacent forwarding engines

Answer: D

Q818. In MPLS, what is the purpose of the label distribution protocol (LDP)?

- A. It converts IP headers into MPLS labels at network edges
- B. It establishes label-switched paths by distributing label bindings
- C. It encrypts MPLS labels to prevent label spoofing attacks
- D. It monitors label utilization and optimizes path selection

Answer: B

Q819. What is the concept of network telemetry and how does it differ from SNMP polling?

- A. Telemetry pushes data in real-time while SNMP uses periodic polling
- B. Telemetry is limited to local networks while SNMP works globally
- C. Telemetry requires manual data collection while SNMP is automated
- D. Telemetry only monitors hardware while SNMP monitors software too

Answer: A

Q820. What is the role of a route reflector in large-scale BGP deployments?

- A. It converts eBGP routes into OSPF routes for internal distribution
- B. It encrypts BGP update messages between internal BGP speakers
- C. It reduces the need for full mesh iBGP peering by reflecting routes
- D. It filters malicious BGP routes from external autonomous systems

Answer: C

Q821. What is the throughput efficiency of the pure ALOHA protocol expressed as a fraction?

- A. Approximately 18.4% maximum channel utilization
- B. Approximately 36.8% maximum channel utilization
- C. Approximately 50.0% maximum channel utilization
- D. Approximately 25.0% maximum channel utilization

Answer: A

Q822. In the CRC error detection scheme, if the generator polynomial is $x^4 + x + 1$, how many check bits are appended?

- A. 5 check bits are appended to the data
- B. 3 check bits are appended to the data
- C. 6 check bits are appended to the data
- D. 4 check bits are appended to the data

Answer: D

Q823. What is the maximum throughput efficiency of slotted ALOHA compared to pure ALOHA?

- A. Slotted ALOHA triples throughput to about 55.2% by using time slots
- B. Slotted ALOHA quadruples throughput to about 73.6% by time slots
- C. Slotted ALOHA doubles throughput to about 36.8% by using time slots
- D. Slotted ALOHA achieves the same throughput as pure ALOHA protocol

Answer: C

Q824. In a Hamming code with 11-bit data words, how many redundancy bits are required?

- A. 3 redundancy bits for 11 data bits
- B. 4 redundancy bits for 11 data bits
- C. 5 redundancy bits for 11 data bits
- D. 6 redundancy bits for 11 data bits

Answer: B

Q825. What is the difference between 1-persistent and p-persistent CSMA?

- A. p-persistent transmits immediately when idle while 1-persistent transmits with probability p
- B. p-persistent is used only in wireless networks while 1-persistent is for wired only
- C. 1-persistent waits a random time while p-persistent waits a fixed time period
- D. 1-persistent transmits immediately when idle while p-persistent transmits with probability p

Answer: D

Q826. What is the purpose of the BPDU (Bridge Protocol Data Unit) in spanning tree operation?

- A. It exchanges topology information between bridges for loop prevention
- B. It carries user data frames between bridges in the network
- C. It encrypts forwarding table entries for secure bridge operation
- D. It assigns IP addresses to bridge ports during initialization

Answer: A

Q827. In Link Aggregation (IEEE 802.3ad), what is the primary benefit of combining multiple physical links?

- A. It enables different speed links to operate at the same data rate
- B. It increases bandwidth and provides link redundancy as one logical link
- C. It eliminates the need for spanning tree on aggregated link ports
- D. It reduces the MAC address table size on connected switches

Answer: B

Q828. What is the channel capture effect in CSMA/CD networks?

- A. When the broadcast domain captures all unicast frames on the segment
- B. When a switch port captures and mirrors all traffic for monitoring
- C. When one station dominates the channel because its backoff counter resets to zero after success
- D. When a collision causes all stations to simultaneously attempt retransmission

Answer: C

Q829. What is the purpose of the 802.1Q native VLAN concept?

- A. It handles untagged frames on a trunk link by assigning them to a default VLAN
- B. It reserves bandwidth for management traffic between switches
- C. It encrypts inter-VLAN routing traffic on Layer 3 switches
- D. It assigns all unknown unicast traffic to a quarantine VLAN

Answer: A

Q830. How does the token bucket algorithm differ from the leaky bucket algorithm for traffic shaping?

- A. Token bucket discards excess tokens while leaky bucket stores them indefinitely
- B. Leaky bucket allows bursts up to a limit while token bucket enforces a constant rate
- C. Leaky bucket uses tokens for rate control while token bucket uses timers only
- D. Token bucket allows bursts up to a limit while leaky bucket enforces a constant rate

Answer: D

Q831. Given the address 10.45.128.0/17, how many host addresses are available in this subnet?

- A. 32,766 usable host addresses available
- B. 131,070 usable host addresses available
- C. 65,534 usable host addresses available
- D. 16,382 usable host addresses available

Answer: A

Q832. In OSPF, what is the purpose of stub areas?

- A. They serve as the backbone area connecting all other OSPF areas
- B. They handle inter-area routing between non-backbone OSPF areas
- C. They contain all external routes and redistribute them to other areas
- D. They block external route advertisements to reduce routing table size

Answer: D

Q833. What is the purpose of the BGP LOCAL_PREF attribute?

- A. It tracks the sequence of autonomous systems a route has traversed
- B. It specifies the physical distance to the destination network prefix
- C. It indicates the preference for exit paths within an autonomous system
- D. It assigns a community tag for route filtering between providers

Answer: C

Q834. What is the difference between NAT and PAT (Port Address Translation)?

- A. PAT maps each private IP to a unique public IP while NAT uses port-based multiplexing
- B. PAT supports only TCP traffic while NAT supports both TCP and UDP protocols
- C. NAT operates at the data link layer while PAT operates at the network layer only
- D. NAT maps each private IP to a unique public IP while PAT maps many to one using ports

Answer: D

Q835. What is the poison reverse technique in distance-vector routing?

- A. Setting the metric to infinity for routes learned from a neighbor back to that neighbor
- B. Sending routing updates with encrypted metrics to prevent tampering by attackers
- C. Removing failed routes immediately from the routing table without waiting for timers
- D. Blocking all routing updates from a specific neighbor for a fixed timeout period

Answer: A

Q836. In IPv6, what is a link-local address and what prefix does it use?

- A. A multicast group address using the ff00::/8 address prefix
- B. An address valid only on a single link using the fe80::/10 prefix
- C. A loopback address using the ::1/128 single host address
- D. A globally routable address using the 2001::/16 address prefix

Answer: B

Q837. What is the purpose of the OSPF virtual link?

- A. To connect non-backbone areas that are not physically adjacent to Area 0
- B. To redistribute external routes from BGP into the OSPF routing domain
- C. To load balance traffic between two equal-cost paths in the backbone
- D. To provide encrypted tunnels between OSPF routers across the internet

Answer: A

Q838. What is Gratuitous ARP and what is its primary use case?

- A. An ARP message that assigns new IP addresses to devices joining a network
- B. An ARP reply sent in response to a multicast discovery query from a router
- C. An ARP request where the sender asks for its own IP to detect address conflicts
- D. An ARP update used to flush old MAC entries from neighboring device tables

Answer: C

Q839. In BGP route selection, what is the MED (Multi-Exit Discriminator) attribute used for?

- A. To indicate the maximum number of paths available for equal-cost load balancing
- B. To determine the originating router's preference for internal path selection
- C. To specify the exit point for traffic leaving the local autonomous system
- D. To suggest preferred entry points into an AS to neighboring autonomous systems

Answer: D

Q840. What is the purpose of the Router Solicitation and Router Advertisement messages in IPv6?

- A. They establish IPsec security associations between IPv6 endpoints
- B. They enable hosts to discover routers and obtain network configuration
- C. They provide DNS resolution services for IPv6 host name lookups
- D. They are used for multicast group membership management on a link

Answer: B

Q841. In TCP congestion control, what is the additive increase multiplicative decrease (AIMD) principle?

- A. Window stays constant during data transfer and doubles when congestion is cleared
- B. Window increases exponentially during slow start and resets to one on any timeout
- C. Window doubles on each ACK and halves on congestion detection for rapid adaptation
- D. Window increases by one MSS per RTT and halves on congestion for stable convergence

Answer: D

Q842. What is the TCP CUBIC algorithm and when is it commonly used?

- A. A retransmission algorithm that groups lost segments into cubic-sized recovery blocks
- B. A congestion control algorithm using a cubic function for window growth in high-BDP networks
- C. A scheduling algorithm that assigns cubic priority levels to competing TCP flows
- D. A flow control algorithm that triples the window size after each successful round trip

Answer: B

Q843. What is the TCP fast open (TFO) mechanism designed to reduce?

- A. The CPU cost of computing TCP checksums on high-throughput connections
- B. The overhead of maintaining idle TCP connection state on servers
- C. The latency of TCP connection establishment by sending data in the SYN
- D. The bandwidth consumed by TCP keepalive probes on long-lived connections

Answer: C

Q844. What is the fundamental problem that QUIC's connection migration solves?

- A. The inability to maintain a session when a client's IP address changes
- B. The difficulty of encrypting UDP traffic across multiple network paths
- C. The complexity of implementing flow control over unreliable datagram service
- D. The overhead of establishing separate TLS and TCP handshake sequences

Answer: A

Q845. In TCP, what is the purpose of the Karn's algorithm?

- A. It prevents RTT estimation from using retransmitted segments' measurements
- B. It selects the best MSS value based on the path MTU discovery results
- C. It calculates optimal initial window size based on network bandwidth estimates
- D. It determines when to switch from slow start to congestion avoidance phase

Answer: A

Q846. What is the BBR (Bottleneck Bandwidth and Round-trip) congestion control approach?

- A. A delay-based algorithm that reduces rate only when latency exceeds a threshold
- B. A model-based algorithm that estimates bottleneck bandwidth and minimum RTT
- C. A loss-based algorithm that halves the window on any detected packet loss
- D. A hybrid algorithm combining slow start with multiplicative decrease on timeout

Answer: B

Q847. What problem does TCP's Nagle algorithm interaction with delayed ACK cause?

- A. It causes excessive retransmissions due to premature timeouts on the sender
- B. It causes connection resets when both algorithms activate simultaneously
- C. It leads to buffer overflow on the receiver due to rapid small packet arrival
- D. It creates a latency problem where small writes are delayed up to 500ms

Answer: D

Q848. What is the purpose of the SCTP (Stream Control Transmission Protocol)?

- A. To reduce TCP header size for low-bandwidth satellite communication links
- B. To encrypt all transport layer communications without needing TLS overhead
- C. To provide multi-homing and multi-streaming over a single transport association
- D. To replace UDP entirely for all real-time multimedia streaming applications

Answer: C

Q849. How does Explicit Congestion Notification (ECN) reduce packet loss?

- A. It allows routers to signal congestion by marking packets rather than dropping them
- B. It encrypts congestion signals to prevent third parties from dropping packets
- C. It reserves bandwidth for critical flows to prevent congestion from occurring
- D. It duplicates packets across alternate paths to bypass congested network links

Answer: A

Q850. What is the difference between TCP Tahoe and TCP NewReno in handling multiple losses?

- A. NewReno doubles the ssthresh on loss while Tahoe halves it before entering slow start
- B. Tahoe enters fast recovery for each loss while NewReno resets to slow start on every loss
- C. NewReno can handle multiple losses in one window without exiting fast recovery while Tahoe cannot
- D. Tahoe uses selective acknowledgments while NewReno relies only on cumulative acknowledgments

Answer: C

Q851. What is HTTP/3's primary underlying transport protocol and why was it chosen?

- A. QUIC was chosen because it eliminates head-of-line blocking at the transport layer
- B. TCP was chosen because it provides built-in reliable ordered delivery
- C. DCCP was chosen because it provides congestion control without reliability overhead
- D. SCTP was chosen because it supports multi-homing natively across interfaces

Answer: A

Q852. What is the purpose of the DNS SRV record?

- A. It maps domain names to IPv4 addresses for web server access
- B. It creates an alias pointing one domain name to another domain
- C. It stores arbitrary text data associated with a DNS domain name
- D. It specifies the host and port for a specific service within a domain

Answer: D

Q853. What is the key difference between HTTP/2 server push and WebSocket communication?

- A. WebSocket allows the server to proactively send resources while server push provides full-duplex channels
- B. WebSocket requires HTTP/2 as a transport while server push works independently of version
- C. Server push allows the server to proactively send resources while WebSocket provides full-duplex communication
- D. Server push works only with GET requests while WebSocket works with all HTTP methods

Answer: C

Q854. What is the OCSP (Online Certificate Status Protocol) used for in HTTPS?

- A. To negotiate the cipher suite for TLS encrypted connections
- B. To check the revocation status of a digital certificate in real time
- C. To generate and distribute new SSL certificates to web servers
- D. To compress certificate chains for faster TLS handshake completion

Answer: B

Q855. What is the concept of HTTP content negotiation?

- A. The mechanism where client and server agree on the best representation of a resource
- B. The process of establishing a TCP connection before sending HTTP requests
- C. The method of splitting large HTTP responses into smaller chunked transfers
- D. The technique of compressing HTTP headers to reduce request overhead

Answer: A

Q856. What is DNS zone transfer and which record type initiates it?

- A. The encryption of DNS query data using DNSKEY records for secure transfer
- B. The migration of domain registration between different DNS registrars
- C. The process of delegating a subdomain to a different nameserver using NS records
- D. The replication of DNS data between servers initiated by the SOA record

Answer: D

Q857. What is the purpose of HPACK header compression in HTTP/2?

- A. It combines multiple HTTP requests into a single TCP segment for efficiency
- B. It encrypts HTTP headers to prevent man-in-the-middle header inspection
- C. It reduces header overhead by encoding headers using static and dynamic tables
- D. It compresses the HTTP response body for faster content delivery

Answer: C

Q858. What is the purpose of the DANE (DNS-based Authentication of Named Entities) protocol?

- A. To encrypt all DNS queries between recursive resolvers and stub resolvers
- B. To authenticate DNS client requests using challenge-response mechanisms
- C. To provide automatic DNS failover when primary nameservers become unavailable
- D. To bind TLS certificates to domain names using TLSA DNS records

Answer: D

Q859. What is the difference between HTTP caching with ETag and Last-Modified headers?

- A. ETag uses a content hash for validation while Last-Modified uses a timestamp
- B. ETag works only with static content while Last-Modified handles dynamic content
- C. Last-Modified uses a content hash while ETag relies on file size comparisons
- D. Last-Modified is more precise than ETag for detecting content modifications

Answer: A

Q860. What is the Server-Sent Events (SSE) mechanism and how does it compare to WebSocket?

- A. SSE requires a dedicated transport protocol while WebSocket uses standard HTTP
- B. SSE provides unidirectional server-to-client streaming over HTTP while WebSocket is bidirectional
- C. SSE provides bidirectional communication while WebSocket is server-to-client only
- D. SSE supports binary data frames while WebSocket is limited to text-only messages

Answer: B

Q861. What is the purpose of the 802.11r (Fast BSS Transition) standard?

- A. It increases wireless data throughput by doubling channel bandwidth
- B. It reduces roaming latency by pre-authenticating with target access points
- C. It adds support for the 6 GHz frequency band in enterprise deployments
- D. It provides backward compatibility with legacy 802.11b/g wireless clients

Answer: B

Q862. What is the SAE (Simultaneous Authentication of Equals) protocol in WPA3?

- A. A multi-factor authentication system requiring biometric verification for WiFi access
- B. A certificate-based authentication protocol replacing pre-shared keys entirely
- C. A key exchange protocol replacing the WPA2 four-way handshake with stronger security
- D. A centralized authentication protocol that requires a RADIUS server for all clients

Answer: C

Q863. What is the concept of small cells in 5G network densification?

- A. Deploying low-power base stations covering small areas to increase capacity
- B. Compressing cell tower signals into smaller packets for faster processing
- C. Reducing the physical size of 5G base station equipment for portability
- D. Using smaller frequency bands to achieve higher penetration through walls

Answer: A

Q864. What is the purpose of the FILS (Fast Initial Link Setup) protocol in WiFi?

- A. It extends the range of WiFi signals using advanced beamforming techniques
- B. It provides redundant link connectivity between access points and switches
- C. It enables file sharing between WiFi clients without requiring an access point
- D. It accelerates initial WiFi connection setup for IoT and mobile devices

Answer: D

Q865. What is Non-Orthogonal Multiple Access (NOMA) being considered for in future wireless systems?

- A. Eliminating the need for base stations by enabling pure device-to-device networks
- B. Reducing antenna count requirements by using single-element directional antennas
- C. Allowing multiple users to share the same frequency and time resources via power levels
- D. Providing stronger encryption for wireless data transmission security

Answer: C

Q866. What is the purpose of the Opportunistic Wireless Encryption (OWE) in WiFi?

- A. It opportunistically increases bandwidth by combining adjacent channels
- B. It encrypts wireless management frames to prevent deauthentication attacks
- C. It provides authenticated encryption on password-protected WiFi networks
- D. It encrypts open WiFi network traffic without requiring a shared password

Answer: D

Q867. What is the concept of coordinated multi-point (CoMP) in LTE-Advanced?

- A. Multiple base stations jointly processing signals to reduce interference at cell edges
- B. A single base station dynamically adjusting its coverage area based on demand
- C. Coordinating spectrum allocation between licensed and unlicensed frequency bands
- D. Coordinating multiple mobile devices to form a mesh network

Answer: A

Q868. What is the Multi-Link Operation (MLO) feature in WiFi 7 (802.11be)?

- A. It enables a device to connect to multiple SSIDs at the same time
- B. It allows a single device to simultaneously use multiple frequency bands and channels
- C. It provides link-level encryption across multiple concurrent sessions
- D. It connects multiple access points using wireless backhaul links

Answer: B

Q869. What is the Reconfigurable Intelligent Surface (RIS) technology being explored for 6G?

- A. A reconfigurable processor that adapts its architecture for different protocols
- B. A software-defined antenna that changes its frequency band dynamically
- C. A self-healing network fabric that repairs physical cable breaks automatically
- D. A surface with controllable elements that can reflect and shape wireless signals

Answer: D

Q870. What is the Private 5G network concept and what advantage does it offer enterprises?

- A. A consumer 5G plan with guaranteed bandwidth for home users
- B. A virtual private network tunnel running exclusively over public 5G infrastructure
- C. A dedicated 5G network operated by an enterprise for its own use with controlled QoS
- D. A 5G network that operates only in airplane mode for in-flight connectivity

Answer: C

Q871. What is the concept of a service mesh in cloud-native architecture?

- A. A physical network connecting cloud data centers across regions using fiber links
- B. A mesh of virtual machines providing redundant compute capacity for applications
- C. A dedicated infrastructure layer handling service-to-service communication in microservices
- D. A security framework that meshes multiple firewall rules into a single policy

Answer: C

Q872. What is the purpose of a cloud-native GitOps approach?

- A. It converts Git commit messages into automated cloud billing invoices
- B. It uses Git repositories as the single source of truth for declarative infrastructure and deployments
- C. It provides a Git-based code editor hosted in the cloud for collaborative programming
- D. It synchronizes Git repositories across multiple cloud providers for code redundancy

Answer: B

Q873. What is the twelve-factor app methodology in cloud application design?

- A. A pricing model with twelve tiers of service for different cloud workload sizes
- B. A methodology with twelve principles for building scalable, maintainable cloud-native apps
- C. A security framework defining twelve encryption standards for cloud applications
- D. A testing framework requiring twelve automated test suites before cloud deployment

Answer: B

Q874. What is the purpose of a cloud access security broker (CASB)?

- A. It provides visibility, compliance, and threat protection for cloud service usage
- B. It negotiates pricing between cloud customers and cloud service providers
- C. It brokers compute resources between different cloud provider regions
- D. It distributes network traffic across multiple cloud availability zones

Answer: A

Q875. What is the concept of cloud-native observability and its three pillars?

- A. Compute, storage, and networking resources monitored for utilization
- B. Encryption, authentication, and authorization for securing cloud services
- C. Availability, durability, and scalability measured across cloud deployments
- D. Metrics, logs, and distributed traces for understanding system behavior

Answer: D

Q876. What is the purpose of a cloud landing zone?

- A. A disaster recovery site that activates when the primary cloud region fails
- B. A physical location where cloud data center construction begins
- C. A pre-configured, secure, multi-account cloud environment following best practices
- D. A staging environment where applications are tested before going to production

Answer: C

Q877. What is the blast radius concept in cloud architecture?

- A. The coverage area of a cloud provider's content delivery network edges
- B. The processing speed of a distributed cloud computing cluster under load
- C. The scope of impact when a failure or security incident occurs in the system
- D. The maximum geographic distance a cloud data center can serve effectively

Answer: C

Q878. What is the strangler fig pattern in cloud migration?

- A. A pattern that monitors cloud costs and automatically shuts down idle resources
- B. A pattern of incrementally replacing legacy components with new cloud services over time
- C. A pattern where legacy systems are immediately replaced by cloud-native versions
- D. A pattern for distributing database queries across multiple cloud-hosted replicas

Answer: B

Q879. What is the concept of data gravity in cloud computing?

- A. The gravitational pull affecting satellite-based cloud network connections
- B. The force required to transfer large datasets between different clouds
- C. The physical weight of storage hardware in cloud data center facilities
- D. The tendency of data to attract applications and services to its location

Answer: D

Q880. What is the difference between cloud repatriation and cloud migration?

- A. Migration moves workloads to the cloud while repatriation moves them back on-premises
- B. Migration is automated while repatriation requires manual intervention for every workload
- C. Repatriation moves workloads from on-premises to cloud while migration moves within clouds
- D. Repatriation upgrades cloud services while migration downgrades them for cost savings

Answer: A

Q881. What is the difference between IKEv1 and IKEv2 in IPsec VPN establishment?

- A. IKEv2 uses fewer message exchanges and supports MOBIKE for seamless mobility
- B. IKEv2 only supports pre-shared keys while IKEv1 supports certificate authentication
- C. IKEv1 is more efficient with fewer exchanges while IKEv2 requires more overhead
- D. IKEv1 natively supports NAT traversal while IKEv2 requires additional configuration

Answer: A

Q882. What is the purpose of certificate transparency (CT) logs?

- A. To manage the lifecycle of internal certificates within an organization
- B. To store private keys securely for all issued digital certificates
- C. To encrypt certificate revocation lists before distributing them to clients
- D. To provide a public, verifiable record of all issued TLS certificates for a domain

Answer: D

Q883. What is a side-channel attack in cryptographic systems?

- A. An attack that intercepts encrypted data during transmission through network side channels
- B. An attack that exploits physical implementation details like timing, power, or electromagnetic emissions
- C. An attack that uses social engineering to obtain encryption keys from system administrators
- D. An attack that directly breaks the mathematical foundation of an encryption algorithm

Answer: B

Q884. What is the MITRE ATT&CK framework used for in cybersecurity?

- A. It defines compliance requirements for financial services security standards
- B. It offers automated penetration testing tools for discovering network vulnerabilities
- C. It catalogs adversary tactics, techniques, and procedures based on real-world observations
- D. It provides a standardized encryption algorithm for securing network protocols

Answer: C

Q885. What is the purpose of HPKP (HTTP Public Key Pinning) and why was it deprecated?

- A. It pinned port numbers to services but was deprecated due to conflicts with NAT devices
- B. It pinned public keys to prevent MitM attacks but risked permanent site lockout on misconfiguration
- C. It pinned DNS records to prevent cache poisoning but was deprecated due to complexity
- D. It pinned session cookies to prevent hijacking but was deprecated due to privacy concerns

Answer: B

Q886. What is the difference between SOAR and SIEM in security operations?

- A. SIEM replaces human analysts entirely while SOAR assists them with data visualization
- B. SOAR collects and analyzes security data while SIEM automates response and orchestration workflows
- C. SOAR is used only in cloud environments while SIEM works exclusively in on-premises setups
- D. SIEM collects and analyzes security data while SOAR automates response and orchestration workflows

Answer: D

Q887. What is the concept of a supply chain attack in cybersecurity?

- A. An attack that compromises software or hardware through a trusted third-party vendor
- B. An attack targeting the physical delivery of hardware networking equipment
- C. An attack on the logistics systems used for shipping cloud data center components
- D. An attack that disrupts the supply of electricity to critical infrastructure systems

Answer: A

Q888. What is the purpose of RPKI (Resource Public Key Infrastructure) for BGP security?

- A. It provides authentication for BGP peer sessions using digital certificates
- B. It monitors BGP routing tables for anomalies and generates security alerts
- C. It validates the authorization of ASes to originate specific IP prefixes
- D. It encrypts all BGP route advertisements between autonomous systems

Answer: C

Q889. What is the concept of microsegmentation in zero trust network security?

- A. Breaking large security policies into micro-policies for faster processing
- B. Segmenting encryption keys into smaller fragments for distributed storage
- C. Creating fine-grained security zones around individual workloads or applications
- D. Dividing network traffic into microsecond time slots for precise scheduling

Answer: C

Q890. What is the TLS 1.3 0-RTT resumption feature and what security risk does it introduce?

- A. It allows data transfer without any handshake but introduces vulnerability to replay attacks
- B. It pre-negotiates cipher suites but increases susceptibility to downgrade attacks
- C. It caches session keys permanently but makes them vulnerable to key extraction
- D. It eliminates encryption overhead entirely but allows passive eavesdropping on initial data

Answer: A

Q891. What is the concept of Terahertz (THz) communication being explored for 6G?

- A. A technique for compressing data to one-terabyte packets for faster delivery
- B. A method of using terraforming technology to improve signal propagation distance
- C. Communication using frequencies between 0.1 and 10 THz for extremely high data rates
- D. Communication using thermal radiation from electronic components for data encoding

Answer: C

Q892. What is the concept of Ambient IoT in next-generation networks?

- A. Battery-free IoT devices that harvest energy from ambient sources like RF signals
- B. IoT devices that only function in controlled indoor environments
- C. Background IoT processes running on cloud servers during low-demand periods
- D. IoT sensors designed specifically for monitoring air quality and pollution

Answer: A

Q893. What is the purpose of Integrated Sensing and Communication (ISAC) in 6G?

- A. Integrating multiple ISP connections into a single logical communication pipe
- B. Using communication signals simultaneously for both data transmission and radar sensing
- C. Integrating wired and wireless sensors into a single network management platform
- D. Combining sensory input devices like cameras and microphones for video conferencing

Answer: B

Q894. What is the role of the ORAN Alliance's RIC (RAN Intelligent Controller)?

- A. It manages billing and subscription information for mobile network users
- B. It controls the physical orientation of radio antennas at cell sites
- C. It provides intelligent, programmable control and optimization of RAN functions
- D. It encrypts all radio access network traffic using quantum-resistant algorithms

Answer: C

Q895. What is the concept of semantic communication in future networks?

- A. Communication that focuses on transmitting the meaning rather than exact bit sequences
- B. Communication that uses natural language processing to translate between languages
- C. A standardized naming convention for network protocols and services
- D. A technique for embedding metadata into network packet headers

Answer: A

Q896. What is the purpose of Non-Terrestrial Networks (NTN) in 3GPP standards?

- A. Providing networking services exclusively for underground data centers
- B. Creating isolated networks that operate without any connection to the internet
- C. Deploying submarine cables for transoceanic high-capacity data transmission
- D. Integrating satellite and aerial platforms into the cellular network ecosystem

Answer: D

Q897. What is the concept of AI-native networking in 6G vision?

- A. Training AI models exclusively on network traffic data from previous 5G deployments
- B. Using AI only for post-deployment network troubleshooting and incident reports
- C. Replacing all network protocols with AI-generated custom protocols for each connection
- D. Designing networks where AI is a fundamental architectural component from the ground up

Answer: D

Q898. What is the concept of digital twin network (DTN) in next-generation network management?

- A. Connecting two data centers using twin fiber optic cables for maximum bandwidth
- B. Creating a real-time virtual model of the network for prediction, optimization, and verification
- C. Mirroring all network traffic to a second network for security analysis
- D. Deploying two identical physical networks for redundancy and failover purposes

Answer: B

Q899. What is the purpose of the ETSI Multi-access Edge Computing (MEC) standard?

- A. It manages authentication of edge devices connecting to core networks
- B. It standardizes the encryption protocols used at network edge devices
- C. It defines a framework for running applications at the network edge with low latency
- D. It specifies hardware requirements for edge computing server equipment

Answer: C

Q900. What is the concept of zero-touch network and service management (ZSM)?

- A. Fully automated end-to-end network management without human intervention
- B. Networks that operate without any software updates or maintenance
- C. Networks requiring no physical cables or hardware for operation
- D. Touch-free interfaces for configuring network devices using gestures

Answer: A