1. Question: Calculate the maximum number of subcarriers in a 50 MHz 5G channel with 15 kHz spacing.
Options:
A) 2000
B) 3333
C) 4000
D) 5000
Answer: B
2. Question: Calculate the bandwidth of a Cat5e cable for 1 Gbps Ethernet over 100 meters.
Options:
A) 100 MHz
B) 250 MHz
C) 350 MHz
D) 500 MHz
Answer: A
3. Question: Calculate the signal loss in a 20 km multimode fiber link with 1.5 dB/km attenuation.
Options:
A) 20 dB
B) 25 dB
C) 30 dB
D) 35 dB
Answer: C
4. Question: How many physical links are required for a full mesh topology with 7 nodes?
Options:
A) 7
B) 14
C) 21
D) 28
Answer: C
5. Question: What is the typical power output of a 5G mmWave small cell?
Options:
A) 0.5–2 W
B) 2–5 W
C) 5–10 W
D) 10–20 W
Answer: A
6. Question: Calculate the maximum number of subcarriers in a 400 MHz 5G channel with 120 kHz spacing.
Options:
A) 2000
B) 2500
C) 3333
D) 4000
Answer: C
7. Question: Calculate the bandwidth of a Cat6 cable for 1 Gbps Ethernet over 100 meters.
Options:
A) 100 MHz
B) 250 MHz
C) 500 MHz
D) 600 MHz
Answer: B
8. Question: Which topology requires the least maintenance for a 5-node network?
Options:
A) Bus
B) Ring
C) Mesh
D) Tree
Answer: A

9. Question: What is the typical wavelength of a 60 GHz mmWave signal in a vacuum?
Options:
A) 0.5 cm
B) 1 cm
C) 5 cm
D) 10 cm
Answer: A
10. Question: Calculate the total attenuation in a 10 km fiber optic link with 0.35 dB/km loss.
Options:
A) 2.5 dB
B) 3.5 dB
C) 4.5 dB
D) 5.5 dB
Answer: B
11. Question: What is the typical coverage range of a 5G small cell in a suburban area?
Options:
A) 50–100 meters
B) 100–300 meters
C) 300–500 meters
D) 500–1000 meters
Answer: B
12. Question: Calculate the maximum data rate for an 80 MHz Wi-Fi channel with 256-QAM and 1 spatial stream.
Options:
A) 400 Mbps
B) 600 Mbps
C) 800 Mbps
D) 1000 Mbps
Answer: B
13. Question: What is the typical power consumption of a 5G macro cell?
Options:
A) 1–2 kW
B) 2–5 kW
C) 5–10 kW
D) 10–20 kW
Answer: C
14. Question: Calculate the spectral efficiency of a 5G channel with 2 Gbps throughput over 200 MHz bandwidth.
Options:
A) 8 bps/Hz
B) 10 bps/Hz
C) 12 bps/Hz
D) 14 bps/Hz
Answer: B
15. Question: How many links are needed for a full mesh topology with 6 nodes?
Options:
A) 6
B) 12
C) 15
D) 30
Answer: C
16. Question: What is the maximum distance for 5 Gbps Ethernet over Cat6 cable?
Options:
A) 50 meters
B) 100 meters
C) 150 meters
D) 200 meters
Answer: B

17. Question: How many links are required in a ring topology with 10 nodes?
Options:
A) 9
B) 10
C) 11
D) 20
Answer: B
18. Question: Calculate the signal loss in a 50 km fiber optic link with 0.15 dB/km loss.
Options:
A) 6.5 dB
B) 7.5 dB
C) 8.5 dB
D) 9.5 dB
Answer: B
19. Question: What is the typical range of a multimode fiber for 1 Gbps Ethernet?
Options:
A) 100 meters
B) 550 meters
C) 1 km
D) 10 km
Answer: B
20. Question: Calculate the propagation delay for a 200-meter twisted pair cable with a velocity of 1.8 × 10^8 m/s.
Options:
A) 0.8 µs
B) 1.11 µs
C) 1.5 µs
D) 2.0 µs
Answer: B
21. Question: Which medium is ideal for a high-speed campus backbone network over 5 km?
Options:
A) Coaxial
B) Twisted pair
C) Multi-mode fiber
D) Single-mode fiber
Answer:D
22. Question: Calculate the maximum data rate for a 20 MHz Wi-Fi channel with 64-QAM and 1 spatial stream.
Options:
A) 144 Mbps
B) 216 Mbps
C) 288 Mbps
D) 433 Mbps
Answer: A
23. Question: What is the typical indoor range of a 2.4 GHz Wi-Fi access point?
Options:
A) 10–20 meters
B) 20–50 meters
C) 50–100 meters
D) 100–150 meters
Answer: C
24. Question: Calculate the signal loss in a 1 km multimode fiber link at 1300 nm with 1 dB/km attenuation.
Options:
A) 0.5 dB
B) 1.0 dB
C) 1.5 dB
D) 2.0 dB
Answer: B

25. Question: How many physical links are needed for a bus topology with 10 nodes?
Options:
A) 1
B) 9
C) 10
D) 45
Answer: A
26. Question: Calculate the theoretical data rate for a 5G Sub-6 GHz channel with 50 MHz bandwidth and 10 bps/Hz efficiency.
Options:
A) 300 Mbps
B) 400 Mbps
C) 500 Mbps
D) 600 Mbps
Answer: C
27. Question: What is the power consumption difference between a 5G macro cell and a 4G macro cell?
Options:
A) 10–20% higher
B) 30–50% higher
C) Same
D) 10–20% lower
Answer: B
28. Question: What happens if a 50-ohm coaxial cable is terminated with a 50-ohm load?
Options:
A) Signal reflection
B) Signal amplification
C) No effect
D) Signal loss
Answer: C
29. Question: What is the typical frequency band for Bluetooth Low Energy?
Options:
A) 900 MHz
B) 2.4 GHz
C) 5 GHz
D) 24 GHz
Answer: B
30. Question: What is the maximum distance for 1 Gbps Ethernet over Cat6 cable?
Options:
A) 50 meters
B) 100 meters
C) 150 meters
D) 200 meters
Answer: B
31. Question: How many links are required in a ring topology with 20 nodes?
Options:
A) 19
B) 20
C) 21
D) 40
Answer: B
32. Question: Calculate the spectral efficiency of a 5G channel with 1 Gbps throughput over 100 MHz bandwidth.
Options:
A) 8 bps/Hz
B) 10 bps/Hz
C) 12 bps/Hz
D) 14 bps/Hz
Answer: B

33. Question: What is the typical latency for 5G in massive machine-type communications (mMTC)?
Options:
A) 1–5 ms
B) 5–10 ms
C) 10–20 ms
D) 20–50 ms
Answer: C
34. Question: Calculate the signal loss in a 10 km single-mode fiber link with 0.2 dB/km attenuation.
Options:
A) 1 dB
B) 2 dB
C) 3 dB
D) 4 dB
Answer: B
35. Question: Which wireless technology operates in the 2.4 GHz band for low-power IoT devices?
Options:
A) Wi-Fi
B) Bluetooth Low Energy
C) 5G NR
D) NFC
Answer: B
36. Question: Calculate the maximum data rate for a 40 MHz Wi-Fi channel with 64-QAM and 2 spatial streams.
Options:
A) 288 Mbps
B) 433 Mbps
C) 577 Mbps
D) 866 Mbps
Answer: A
37. Question: A SONET network multiplexes 4×622 Mbps streams. What is the total bandwidth?
Options:
A) 1.244 Gbps
B) 2.488 Gbps
C) 3.732 Gbps
D) 4.976 Gbps
Answer: B
38. Question: A SONET frame carries 810 bytes every 125 µs. What is the data rate?
Options:
A) 51.84 Mbps
B) 103.68 Mbps
C) 55.52 Mbps
D) 207.36 Mbps
Answer: A
39. Question: A SONET frame with 9 bytes of path overhead carries 1000-byte packets. What is the overhead percentage?
Options:
A) 0.90%
B) 1.80%
C) 2.70%
D) 3.60%
Answer: A
40. Question: A SONET network multiplexes 8×155 Mbps streams. What is the total bandwidth?
Options:
A) 1.24 Gbps
B) 1.55 Gbps
C) 1.86 Gbps
D) 2.17 Gbps
Answer: A

41. Question: A virtual circuit network sends 1500-byte packets over 3 hops (5 ms/hop). What is the total setup delay?
Options:
A) 10 ms
B) 15 ms
C) 20 ms
D) 25 ms
Answer: B
42. Question: A virtual circuit setup takes 20 ms for 1000-byte packets over a 1 Gbps link. What is the initial latency?
Options:
A) 20 ms
B) 21 ms
C) 22 ms
D) 23 ms
Answer: A
43. Question: A Frame Relay network sends 1000-byte packets with 10% overhead vs. virtual circuits. What is the throughput?
Options:
A) 90% of max
B) 85% of max
C) 80% of max
D) 75% of max
Answer: A
44. Question: An ATM network uses 53-byte cells (5-byte header) for 1000-byte packets. What is the overhead?
Options:
A) 10.40%
B) 9.40%
C) 8.40%
D) 7.40%
Answer: A
45. Question: A 6-bit data 101101 uses even parity. What is the parity bit?
Options:
A) 0
B) 1
C) 2
D) 3
Answer: B
46. Question: A network with 100 devices splits into 4 VLANs. How many devices are in each VLAN?
Options:
A) 20
B) 25
C) 30
D) 40
Answer: B
47. Question: An MPLS VPN with 5 VRF instances routes 500 packets/s per VPN. What is the total routing table size?
Options:
A) 1000 entries
B) 1500 entries
C) 2000 entries
D) 2500 entries
Answer: D

48. Question: An MPLS network with 10 Gbps links routes 1500-byte packets. What is the max packet rate with 5% load balancing?
Options:
A) 833,333 packets/s
B) 791,667 packets/s
C) 750,000 packets/s
D) 708,333 packets/s
Answer: B
49. Question: An MPLS network carries IPv6 packets (1500 bytes) at 10 Gbps. What is the throughput with 5% overhead?
Options:
A) 9.5 Gbps
B) 9.0 Gbps
C) 8.5 Gbps
D) 8.0 Gbps
Answer: A
50. Question: An MPLS network prioritizes 200-byte VoIP packets at 5 Mbps over 100 Mbps. What is the max VoIP packet rate?
Options:
A) 3125 packets/s
B) 2500 packets/s
C) 2000 packets/s
D) 1500 packets/s
Answer: A
51. Question: An MPLS data center with 10 tenants routes 1000 packets/s per tenant. What is the total packet rate?
Options:
A) 5000 packets/s
B) 10,000 packets/s
C) 15,000 packets/s
D) 20,000 packets/s
Answer: B
52. Question: An MPLS network uses LSPs for 1500-byte packets at 1 Gbps. What is the packet rate per LSP (5 LSPs)?
Options:
A) 133,333 packets/s
B) 166,667 packets/s
C) 200,000 packets/s
D) 233,333 packets/s
Answer: A
53. Question: An MPLS edge router forwards 1500-byte packets at 10 Gbps. What is the packet rate after label removal?
Options:
A) 833,333 packets/s
B) 666,667 packets/s
C) 500,000 packets/s
D) 1,000,000 packets/s
Answer: A
54. Question: An MPLS network supports IPv6 with 1500-byte packets at 10 Gbps. What is the routing table size reduction?
Options:
A) 10%
B) 20%
C) 30%
D) 40%
Answer: B

55. Question: An MPLS network prioritizes VoIP (200 bytes) at 10 Mbps over 100 Mbps. What is the max VoIP packet rate?
Options:
A) 6250 packets/s
B) 5000 packets/s
C) 4000 packets/s
D) 3000 packets/s
Answer: A
56. Question: A 4-bit data word uses Hamming code. How many parity bits are needed?
Options:
A) 2
B) 3
C) 4
D) 5
Answer: B
57. Question: A 7-bit Hamming code reserves parity bits at powers of 2. What is the position of the first parity bit?
Options:
A) 1
B) 2
C) 3
D) 4
Answer: A
58. Question: A 4-bit data 1011 uses Hamming code (even parity). What is the 7-bit code?
Options:
A) 1011011
B) 110011
C) 110111
D) 1010101
Answer: C
59. Question: A 7-bit Hamming code is received with syndrome 000. What is the error status?
Options:
A) Single-bit error
B) Double-bit error
C) No error
D) Parity error
Answer: C
60. Question: A 7-bit Hamming code 0110011 has syndrome 101. Which bit is erroneous?
Options:
A) 1st bit
B) 3rd bit
C) 5th bit
D) 7th bit
Answer: C
61. Question: A Hamming code with 4 parity bits protects how many data bits?
Options:
A) 8
B) 11
C) 15
D) 16
Answer: B
62. Question: A Hamming code protects 7 data bits. What is the total code length?
Options:
A) 10
B) 11
C) 12
D) 14
Answer: B

63. Question: A Hamming code corrects how many bits in a 7-bit code?
Options:
A) 0
B) 1
C) 2
D) 3
Answer: B
64. Question: A Hamming code reserves parity bits at which positions?
Options:
A) 1, 2, 4, 8, …
B) 3, 6, 9, 12, …
C) Even positions
D) Odd positions
Answer: A
65. Question: A 5-bit data 10111 uses odd parity. What is the parity bit?
Options:
A) 0
B) 1
C) 2
D) 3
Answer: B
66. Question: A 2 Mbps link sends 1000-bit frames. How many frames are sent per second?
Options:
A) 1000
B) 2000
C) 3000
D) 4000
Answer: B
67. Question: A 4-bit data 1101 uses CRC polynomial 1011. What is the remainder?
Options:
A) 11
B) 100
C) 110
D) 10
Answer: A
68. Question: A 1000-bit frame uses a degree-4 CRC polynomial. How many zeros are appended?
Options:
A) 3
B) 4
C) 5
D) 6
Answer: B
69. Question: A 1500-byte frame with CRC-32 has a remainder of 0000. What is the frame size in bits?
Options:
A) 12,000
B) 12,032
C) 12,064
D) 12,096
Answer: B
70. Question: A CRC division for a 1000-bit frame uses XOR. What is the frame size after appending a 4-bit remainder?
Options:
A) 1000 bits
B) 1004 bits
C) 1008 bits
D) 1012 bits
Answer: B

71. Question: A CRC polynomial of degree 8 is used for 1000-bit frames. What is the max burst error length detected?
Options:
A) 7 bits
B) 8 bits
C) 9 bits
D) 10 bits
Answer: B
72. Question: A DHCP server assigns 200 addresses in a /23 network. How many addresses remain?
Options:
A) 310
B) 312
C) 510
D) 512
Answer: A
73. Question: A Class B network 172.16.0.0/18 supports how many subnets and hosts per subnet?
Options:
A) 4 subnets, 16,382 hosts
B) 16 subnets, 4,094 hosts
C) 64 subnets, 1,022 hosts
D) 256 subnets, 254 hosts
Answer: B
74. Question: A Distance Vector Routing network with 5 routers has a route cost of 4. If a new link reduces it to 2, what is the new cost?
Options:
A) 2
B) 3
C) 4
D) 5
Answer: A
75. Question: An IPv4 address 192.168.10.18/28 has what broadcast address?
Options:
A) 192.168.10.15
B) 192.168.10.31
C) 192.168.10.16
D) 192.168.10.30
Answer: B
76. Question: An OSPF network doubles a link's cost from 10 to 20. If the link is in the shortest path, what is the new path cost increase?
Options:
A) 5
B) 10
C) 15
D) 20
Answer: B
77. Question: An SDN network with a failed controller has 5 switches with 100 flow entries each. How many packets are forwarded using cached rules?
Options:
A) None
B) 100
C) 500
D) All
Answer: D

78. Question: A network uses a /22 subnet mask. How many host bits are available?
Options:
A) 8
B) 10
C) 12
D) 14
Answer: B
79. Question: A router sends an ICMP Fragmentation Needed message for a 1500-byte packet with MTU 1400. What is the message size?
Options:
A) 28 bytes
B) 36 bytes
C) 56 bytes
D) 64 bytes
Answer: C
80. Question: An IPv6 anycast address serves 10 nodes. How many nodes receive a packet?
Options:
A) 1
B) 5
C) 10
D) All
Answer: A
81. Question: A Class C network needs 500 hosts per subnet. What is the minimum subnet mask?
Options:
A) 255.255.255.0
B) 255.255.254.0
C) 255.255.252.0
D) Not possible
Answer: D
82. Question: An OpenFlow switch with 50 flow entries has action instructions. If 10% of entries are updated in 1 ms, how many entries are updated?
Options:
A) 5
B) 10
C) 50
D) 100
Answer: A
83. Question: A Class C network 192.168.10.0/26 supports how many subnets and hosts?
Options:
A) 4 subnets, 62 hosts
B) 8 subnets, 30 hosts
C) 16 subnets, 14 hosts
D) 32 subnets, 6 hosts
Answer: A
84. Question: A Distance Vector Routing network with 6 routers exchanges 1 KB tables every 30 s. What is the bandwidth per router?
Options:
A) 0.267 kbps
B) 2.67 kbps
C) 26.7 kbps
D) 267 kbps
Answer: A

85. Question: An IPv6 network 2001:0db8::/32 is subnetted with /48. How many subnets are possible?
Options:
A) 256
B) 65,536
C) 512
D) 1,024
Answer: B
86. Question: An IPv4 address 192.168.1.100/24 has what network address?
Options:
A) 192.168.1.0
B) 192.168.0.0
C) 192.168.1.255
D) 192.168.1.100
Answer: A
87. Question: A router sends an ICMP Protocol Unreachable message for a 1500-byte packet. What is the message size?
Options:
A) 28 bytes
B) 36 bytes
C) 56 bytes
D) 64 bytes
Answer: C
88. Question: An SDN application plane defines 200 policies for 5 networks. What is the total number of policies?
Options:
A) 200
B) 400
C) 1,000
D) 2,000
Answer: C
89. Question: An OSPF network sends LSAs only when a link state changes. If 100-byte LSAs are sent every 10 s, what is the bandwidth?
Options:
A) 0.08 kbps
B) 0.8 kbps
C) 8 kbps
D) 80 kbps
Answer: B
90. Question: An IPv6 multicast address FF02::1 sends a packet. How many nodes receive it?
Options:
A) One
B) Nearest
C) All in group
D) None
Answer: C
91. Question: A /29 subnet supports how many valid hosts?
Options:
A) 6
B) 8
C) 14
D) 30
Answer: A
92. Question: A network virtualization setup uses 5 virtual networks with 100 Mbps each on a 1 Gbps link. What is the total bandwidth?
Options:
A) 500 Mbps
B) 1 Gbps
C) 5 Gbps

D) 10 Gbps
Answer: B
93. Question: A Class B network 172.16.0.0/21 supports how many subnets and hosts?
Options:
A) 32 subnets, 2,046 hosts
B) 64 subnets, 1,022 hosts
C) 128 subnets, 510 hosts
D) 256 subnets, 254 hosts
Answer: A
94. Question: An IPv4 address 192.168.10.130/26 has what network and broadcast addresses?
Options:
A) 192.168.10.128, 192.168.10.191
B) 192.168.10.0, 192.168.10.63
C) 192.168.10.64, 192.168.10.127
D) 192.168.10.128, 192.168.10.190
Answer: A
95. Question: A Distance Vector Routing network updates a route from cost 5 to 3 via a new link. What is the new cost?
Options:
A) 3
B) 4
C) 5
D) 6
Answer: A
96. Question: An IPv6 network needs 256 subnets with 65,534 hosts each. What is the prefix length?
Options:
A) 48
B) 56
C) 64
D) 72
Answer: C
97. Question: An OSPF network with 5 routers recalculates SPF after a link failure. If each router takes 40 ms, what is the total time?
Options:
A) 40 ms
B) 80 ms
C) 160 ms
D) 200 ms
Answer: D
98. Question: An SDN controller fails in a network with 10 switches. How many switches use cached flow entries?
Options:
A) 0
B) 5
C) 10
D) None
Answer: C
99. Question: An IPv4 address 192.168.100.130/26 has what network, broadcast, and host count?
Options:
A) 192.168.100.128, 192.168.100.191, 62 hosts
B) 192.168.100.0, 192.168.100.63, 62 hosts
C) 192.168.100.64, 192.168.100.127, 62 hosts
D) 192.168.100.128, 192.168.100.190, 63 hosts
Answer: A

100. Question: A Class C network 192.168.10.0/24 needs 6 subnets. What is the subnet mask and hosts per subnet?
Options:
A) 255.255.255.224, 30 hosts
B) 255.255.255.192, 62 hosts
C) 255.255.255.240, 14 hosts
D) 255.255.255.248, 6 hosts
Answer: A
101. Question: A RIP route to 10.0.0.0/24 has a metric of 16. What is the route status?
Options:
A) Reachable
B) Unreachable
C) Preferred
D) Delayed
Answer: B
102. Question: An IPv6 address FE80::1/10 is used. What is the address type?
Options:
A) Global unicast
B) Link-local
C) Multicast
D) Anycast
Answer: B
103. Question: An OSPF network with 4 routers uses bandwidth-based metrics. If a 10 Mbps link increases to 100 Mbps, what is the new cost?
Options:
A) 1
B) 10
C) 100
D) Unchanged
Answer: A
104. Question: An SDN network programs 5 switches with 200 flow entries each at 1 ms per entry. What is the total programming time?
Options:
A) 200 ms
B) 1,000 ms
C) 2,000 ms
D) 10,000 ms
Answer: B
105. Question: An IPv4 packet with checksum 0x1A2B has a field incremented by 1. What is the new checksum status?
Options:
A) Valid
B) Invalid
C) Unchanged
D) Recalculated
Answer: B
106. Question: A network needs 1,000 hosts per subnet. What is the minimum subnet mask?
Options:
A) 255.255.252.0
B) 255.255.254.0
C) 255.255.255.0
D) 255.255.248.0
Answer: A
107. Question: An OpenFlow flow entry has 100-byte instructions. If 10 entries are updated, what is the total size?
Options:
A) 100 bytes
B) 1,000 bytes
C) 10,000 bytes

D) 100,000 bytes
Answer: B
108. Question: A TCP connection with a 128 KB congestion window and 16 KB MSS sends how many segments per RTT?
Options:
A) 4
B) 8
C) 12
D) 16
Answer: B
109. Question: A 2000-byte packet is sent over a 5 Mbps link with a 15 ms propagation delay. What is the total delay?
Options:
A) 18.2 ms
B) 18.4 ms
C) 18.6 ms
D) 18.8 ms
Answer: A
110. Question: A Go-Back-N ARQ with window size 10, 1000-byte frames, 10 Mbps link, and 20 ms RTT has what throughput?
Options:
A) 4 Mbps
B) 5 Mbps
C) 8 Mbps
D) 10 Mbps
Answer: B
111. Question: A 1 Gbps link sends a 2500-byte packet with a 4 ms propagation delay. What is the total delay?
Options:
A) 4.020 ms
B) 4.040 ms
C) 4.060 ms
D) 4.080 ms
Answer: A
112. Question: A TCP connection starts with a 1 MSS (8 KB MSS) congestion window. After 3 RTTs in slow start, what is the window size?
Options:
A) 16 KB
B) 32 KB
C) 64 KB
D) 128 KB
Answer: B
113. Question: A 1500-byte packet is sent over a 50 Mbps link with a 3 ms propagation delay. What is the total delay?
Options:
A) 3.24 ms
B) 3.36 ms
C) 3.48 ms
D) 3.60 ms
Answer: A
114. Question: A TCP connection with sequence number 20000 sends 7 segments of 1000 bytes each. What is the next segment's sequence number?
Options:
A) 21000
B) 27000
C) 28000
D) 29000
Answer: B

115. Question: A Selective Repeat ARQ with window size 12, 1500-byte frames, and 50 Mbps link has what maximum throughput?
Options:
A) 25 Mbps
B) 50 Mbps
C) 75 Mbps
D) 100 Mbps
Answer: B
116. Question: A TCP connection with a 512 KB window size and 50 ms RTT has what maximum throughput in Mbps?
Options:
A) 81.92 Mbps
B) 163.84 Mbps
C) 245.76 Mbps
D) 327.68 Mbps
Answer: A
117. Question: A 3000-byte packet is sent over a 1 Gbps link with a 2 ms propagation delay. What is the total delay?
Options:
A) 2.024 ms
B) 2.048 ms
C) 2.072 ms
D) 2.096 ms
Answer: A
118. Question: A 10 MB file is sent over a 100 Mbps link with a 10 ms RTT. What is the total transmission time?
Options:
A) 0.810 s
B) 0.820 s
C) 0.830 s
D) 0.840 s
Answer: B
119. Question: A TCP connection with a 256 KB congestion window and 32 KB MSS sends how many segments per RTT?
Options:
A) 4
B) 8
C) 12
D) 16
Answer: B
120. Question: A 1000-byte packet is sent over a 10 Mbps link with a 30 ms propagation delay. What is the total delay?
Options:
A) 30.8 ms
B) 31.6 ms
C) 32.4 ms
D) 33.2 ms
Answer: A
121. Question: A Go-Back-N ARQ with window size 8, 2000-byte frames, 20 Mbps link, and 50 ms RTT has what throughput?
Options:
A) 3.2 Mbps
B) 6.4 Mbps
C) 9.6 Mbps
D) 12.8 Mbps
Answer: B

122. Question: A TCP connection starts with a 1 MSS (16 KB MSS) congestion window. After 2 RTTs in slow start, what is the window size?
Options:
A) 16 KB
B) 32 KB
C) 64 KB
D) 128 KB
Answer: B
123. Question: A 2000-byte packet is sent over a 100 Mbps link with a 5 ms propagation delay. What is the total delay?
Options:
A) 5.16 ms
B) 5.32 ms
C) 5.48 ms
D) 5.64 ms
Answer: A
124. Question: A TCP connection with sequence number 25000 sends 8 segments of 500 bytes each. What is the next segment's sequence number?
Options:
A) 26000
B) 27000
C) 29000
D) 30000
Answer: C
125. Question: A 2 Gbps link sends a 3000-byte packet with a 1 ms propagation delay. What is the total delay?
Options:
A) 1.012 ms
B) 1.024 ms
C) 1.036 ms
D) 1.048 ms
Answer: A
126. Question: A Selective Repeat ARQ with window size 15, 1000-byte frames, and 100 Mbps link has what maximum throughput?
Options:
A) 50 Mbps
B) 75 Mbps
C) 100 Mbps
D) 150 Mbps
Answer: C
127. Question: A TCP connection with a 1 MB window size and 20 ms RTT has what maximum throughput in Mbps?
Options:
A) 400 Mbps
B) 800 Mbps
C) 1200 Mbps
D) 1600 Mbps
Answer: A
128. Question: A 4000-byte packet is sent over a 500 Mbps link with a 4 ms propagation delay. What is the total delay?
Options:
A) 4.064 ms
B) 4.128 ms
C) 4.192 ms
D) 4.256 ms
Answer: A

129. Question: A 20 MB file is sent over a 200 Mbps link with a 5 ms one-way delay. What is the total transmission time?
Options:
A) 0.810 s
B) 0.820 s
C) 0.830 s
D) 0.840 s
Answer: B
130. Question: A TCP connection with a 512 KB congestion window and 64 KB MSS sends how many segments per RTT?
Options:
A) 4
B) 8
C) 12
D) 16
Answer: B
131. Question: A 1500-byte packet is sent over a 20 Mbps link with a 25 ms propagation delay. What is the total delay?
Options:
A) 25.6 ms
B) 26.2 ms
C) 26.8 ms
D) 27.4 ms
Answer: A
132. Question: A Go-Back-N ARQ with window size 9, 1500-byte frames, 50 Mbps link, and 40 ms RTT has what throughput?
Options:
A) 10.8 Mbps
B) 13.5 Mbps
C) 16.2 Mbps
D) 18.9 Mbps
Answer: B
133. Question: A TCP connection starts with a 1 MSS (32 KB MSS) congestion window. After 3 RTTs in slow start, what is the window size?
Options:
A) 64 KB
B) 128 KB
C) 256 KB
D) 512 KB
Answer: B
134. Question: A 2500-byte packet is sent over a 200 Mbps link with a 6 ms propagation delay. What is the total delay?
Options:
A) 6.1 ms
B) 6.2 ms
C) 6.3 ms
D) 6.4 ms
Answer: A
135. Question: A TCP connection with sequence number 35000 sends 9 segments of 3000 bytes each. What is the next segment's sequence number?
Options:
A) 38000
B) 41000
C) 62000
D) 65000
Answer: C

136. Question: A 1 Gbps link sends a 5000-byte packet with a 3 ms propagation delay. What is the total delay?
Options:
A) 3.04 ms
B) 3.08 ms
C) 3.12 ms
D) 3.16 ms
Answer: A
137. Question: A Selective Repeat ARQ with window size 20, 2000-byte frames, and 200 Mbps link has what maximum throughput?
Options:
A) 100 Mbps
B) 150 Mbps
C) 200 Mbps
D) 250 Mbps
Answer: C
138. Question: A TCP connection with a 2 MB window size and 100 ms RTT has what maximum throughput in Mbps?
Options:
A) 160 Mbps
B) 320 Mbps
C) 480 Mbps
D) 640 Mbps
Answer: B
139. Question: A 5000-byte packet is sent over a 1 Gbps link with a 5 ms propagation delay. What is the total delay?
Options:
A) 5.04 ms
B) 5.08 ms
C) 5.12 ms
D) 5.16 ms
Answer: A
140. Question: A 50 MB file is sent over a 500 Mbps link with a 10 ms one-way delay. What is the total transmission time?
Options:
A) 0.820 s
B) 0.840 s
C) 0.860 s
D) 0.880 s
Answer: B
141. Question: A TCP connection with a 1 MB congestion window and 128 KB MSS sends how many segments per RTT?
Options:
A) 4
B) 8
C) 12
D) 16
Answer: B
142. Question: A 2000-byte packet is sent over a 10 Mbps link with a 20 ms propagation delay. What is the total delay?
Options:
A) 20.16 ms
B) 21.32 ms
C) 22.48 ms
D) 23.64 ms
Answer: A

143. Question: A Go-Back-N ARQ with window size 15, 1000-byte frames, 100 Mbps link, and 30 ms RTT has what throughput?
Options:
A) 26.6 Mbps
B) 33.3 Mbps
C) 40.0 Mbps
D) 46.6 Mbps
Answer: B
144. Question: A TCP connection starts with a 1 MSS (128 KB MSS) congestion window. After 2 RTTs in slow start, what is the window size?
Options:
A) 256 KB
B) 512 KB
C) 768 KB
D) 1024 KB
Answer: A
145. Question: A 3000-byte packet is sent over a 500 Mbps link with a 2 ms propagation delay. What is the total delay?
Options:
A) 2.048 ms
B) 2.096 ms
C) 2.144 ms
D) 2.192 ms
Answer: A
146. Question: A TCP connection with sequence number 40000 sends 10 segments of 4000 bytes each. What is the next segment's sequence number?
Options:
A) 44000
B) 48000
C) 80000
D) 84000
Answer: C
147. Question: A 2 Gbps link sends a 4000-byte packet with a 5 ms propagation delay. What is the total delay?
Options:
A) 5.016 ms
B) 5.032 ms
C) 5.048 ms
D) 5.064 ms
Answer: A
148. Question: A Selective Repeat ARQ with window size 25, 1500-byte frames, and 500 Mbps link has what maximum throughput?
Options:
A) 250 Mbps
B) 375 Mbps
C) 500 Mbps
D) 625 Mbps
Answer: C
149. Question: A TCP connection with a 4 MB window size and 50 ms RTT has what maximum throughput in Mbps?
Options:
A) 640 Mbps
B) 1280 Mbps
C) 920 Mbps
D) 2560 Mbps
Answer: A

150. Question: A 6000-byte packet is sent over a 1 Gbps link with a 1 ms propagation delay. What is the total delay?
Options:
A) 1.048 ms
B) 1.096 ms
C) 1.144 ms
D) 1.192 ms
Answer: A
151. Question: A 100 MB file is sent over a 1 Gbps link with a 5 ms one-way delay. What is the total transmission time?
Options:
A) 0.810 s
B) 0.820 s
C) 0.830 s
D) 0.840 s
Answer: B
152. Question: A firewall processes a 6000-byte packet in 0.7 ms and forwards it over a 10 Gbps link with a 4 ms propagation delay. What is the total delay?
Options:
A) 4.3524 ms
B) 4.4048 ms
C) 4.4572 ms
D) 4.5096 ms
Answer: C
153. Question: A DoS attack sends 1000000 packets of 50 bytes each over a 200 Mbps link. What is the transmission time?
Options:
A) 0.2 s
B) 0.25 s
C) 0.3 s
D) 0.35 s
Answer: B
154. Question: A DNS query takes 8 ms to process and involves 5 servers with a 5 ms RTT each. What is the total query time?
Options:
A) 31 ms
B) 32 ms
C) 33 ms
D) 34 ms
Answer: C
155. Question: An SMTP server sends a 40 MB email over a 20 Tbps link with a 10 ms propagation delay. What is the total transmission time?
Options:
A) 0.000016 s
B) 0.010016 s
C) 0.020016 s
D) 0.030016 s
Answer: B
156. Question: An FTP server transfers a 1 TB file over a 200 Tbps link with a 5 ms one-way delay. What is the total transfer time?
Options:
A) 0.04 s
B) 0.045 s
C) 0.05 s
D) 0.055 s
Answer: B

157. Question: An HTTP response of 300000 bytes is sent over a 200 Gbps link with a 1 ms propagation delay. What is the total delay?
Options:
A) 1.012 ms
B) 1.024 ms
C) 1.036 ms
D) 1.048 ms
Answer: A
158. Question: A POP3 client downloads a 7 MB email over a 10 Tbps link with a 10 ms RTT. What is the total download time?
Options:
A) 0.0000056 s
B) 0.0100056 s
C) 0.0200056 s
D) 0.0300056 s
Answer: B
159. Question: An SNMP trap message of 1800 bytes is sent over a 50 Gbps link with a 2 ms propagation delay. What is the total delay?
Options:
A) 2.000288 ms
B) 2.000576 ms
C) 2.000864 ms
D) 2.001152 ms
Answer: A
160. Question: A P2P client downloads a 20 TB file over a 200 Tbps link with a 6 ms one-way delay. What is the total transfer time?
Options:
A) 0.8 s
B) 0.86 s
C) 0.92 s
D) 0.98 s
Answer: A
161. Question: A VoIP packet of 1200 bytes is sent every 20 ms over a 100 Gbps link with a 3 ms propagation delay. What is the total delay per packet?
Options:
A) 3.000096 ms
B) 3.000192 ms
C) 3.000288 ms
D) 3.000384 ms
Answer: A
162. Question: An overlay network routes a 16000-byte packet over a 20 Gbps link with a 4 ms propagation delay. What is the total delay?
Options:
A) 4.0064 ms
B) 4.0128 ms
C) 4.0192 ms
D) 4.0256 ms
Answer: A
163. Question: An SSL connection adds 200 bytes overhead to a 4000-byte packet sent over a 500 Mbps link with a 5 ms propagation delay. What is the total delay?
Options:
A) 5.084 ms
B) 5.168 ms
C) 5.252 ms
D) 5.336 ms
Answer: B

164. Question: A firewall processes 50000 packets of 10 bytes each in 0.0012 ms per packet over a 100 Mbps link. What is the total processing time?
Options:
A) 0.05 s
B) 0.06 s
C) 0.07 s
D) 0.08 s
Answer: C
165. Question: A DoS attack sends 2000000 packets of 25 bytes each over a 200 Mbps link. What is the transmission time?
Options:
A) 0.2 s
B) 0.25 s
C) 0.3 s
D) 0.35 s
Answer: B
166. Question: A DNS query resolves in 10 ms with a 300-byte response over a 6 ms one-way delay and 200 Mbps link. What is the total delay?
Options:
A) 16.012 ms
B) 16.024 ms
C) 16.036 ms
D) 16.048 ms
Answer: A
167. Question: An SMTP server sends a 45 MB email over a 50 Tbps link with a 11 ms propagation delay. What is the total transmission time?
Options:
A) 0.0000072 s
B) 0.0110072 s
C) 0.0220072 s
D) 0.0330072 s
Answer: B
168. Question: An FTP client uploads a 2 TB file over a 500 Tbps link with a 10 ms RTT. What is the total transfer time?
Options:
A) 0.032 s
B) 0.042 s
C) 0.052 s
D) 0.062 s
Answer: B
169. Question: An HTTP request of 3000 bytes is sent over a 200 Gbps link with a 2 ms propagation delay. What is the total delay?
Options:
A) 2.00012 ms
B) 2.00024 ms
C) 2.00036 ms
D) 2.00048 ms
Answer: A
170. Question: What is a P2P network primarily used for?
Options:
A) Centralized data storage
B) Direct data sharing between peers
C) Email transmission
D) Network security
Answer: B

171. Question: A POP3 client retrieves a 8 MB email over a 20 Tbps link with a 15 ms RTT. What is the total download time?
Options:
A) 0.0000032 s
B) 0.0150032 s
C) 0.0300032 s
D) 0.0450032 s
Answer: B
172. Question: An SNMP manager sends a 2000-byte query over a 100 Gbps link with a 1 ms propagation delay. What is the total delay?
Options:
A) 1.00016 ms
B) 1.00032 ms
C) 1.00048 ms
D) 1.00064 ms
Answer: A
173. Question: A P2P network transfers a 50 TB file over a 1 Ptps link with a 5 ms one-way delay. What is the total transfer time?
Options:
A) 0.4 s
B) 0.45 s
C) 0.5 s
D) 0.55 s
Answer: A
174. Question: A VoIP call sends 1300-byte packets every 25 ms over a 50 Gbps link with a 4 ms propagation delay. What is the total delay per packet?
Options:
A) 4.000208 ms
B) 4.000416 ms
C) 4.000624 ms
D) 4.000832 ms
Answer: A
175. Question: An overlay network processes a 17000-byte packet in 10 ms and sends it over a 100 Gbps link with a 3 ms propagation delay. What is the total delay?
Options:
A) 13.00136 ms
B) 13.00272 ms
C) 13.00408 ms
D) 13.00544 ms
Answer: A
176. Question: An SSL/TLS connection encrypts a 3000-byte packet, adding 150 bytes overhead, over a 200 Mbps link with a 5 ms propagation delay. What is the total delay?
Options:
A) 5.126 ms
B) 5.252 ms
C) 5.378 ms
D) 5.504 ms
Answer: B
177. Question: A P2P client downloads a 100 TB file over a 2 Ptps link with a 6 ms one-way delay. What is the total transfer time?
Options:
A) 0.4 s
B) 0.46 s
C) 0.52 s
D) 0.58 s
Answer: A

178. Question: An overlay network routes a 18000-byte packet over a 50 Gbps link with a 4 ms propagation delay. What is the total delay?
Options:
A) 4.00288 ms
B) 4.00576 ms
C) 4.00864 ms
D) 4.01152 ms
Answer: A
179. Question: What does RTT stand for in networking?
Options:
A) Real-Time Transport
B) Round-Trip Time
C) Rapid Transfer Time
D) Remote Terminal Time
Answer: B
180. Question: A network uses a /22 subnet mask. How many host bits are available?
Options:
A) 8
B) 10
C) 12
D) 14
Answer: B