

## CS601-700 Solved MCQs

**1. In a \_\_\_\_\_ connection, more than two devices can share a single link.**

- a. Point-to-point
- b. Primary
- c. Multipoint
- d. Secondary

**answer** (c): Multipoint

**2. Communication between a computer and a keyboard involves \_\_\_\_\_ transmission**

- a. Full-duplex
- b. Half-duplex
- c. Simplex
- d. Automatic

**answer** (c): Simplex

**3. In a network with 25 computers, which topology would require the most extensive cabling?**

- a. Star
- b. Mesh
- c. Bus
- d. Ring

**answer** (b): Mesh

**4. Which topology requires a central controller or hub?**

- a. Star
- b. Mesh
- c. Bus
- d. Ring

**answer** (a): Star

**5. The \_\_\_\_\_ is the physical path over which a message travels.**

- a. Protocol
- b. Medium
- c. Signal
- d. All of the above

**answer** (b): Medium

**6. Which organization has authority over interstate and international commerce in the communications field?**

- a. ITU-T
- b. IEEE
- c. ISO
- d. FCC

**answer** (d): FCC

**7. The information to be communicated in a data communications system is the \_\_\_\_\_**

- a. Medium
- b. Protocol
- c. Transmission
- d. Message

**answer** (d): Message

**8. Frequency of failure and network recovery time after a failure are measures of the \_\_\_\_\_ of a network.**

- a. Performance
- b. Security
- c. Reliability
- d. Feasibility

**answer** (c): Reliability

**9. In \_\_\_\_\_ transmission, the channel capacity is shared by both communicating devices at all times.**

- a. Full-duplex

- b. Simplex
- c. Half-duplex
- d. Half-Simplex

**answer** (a): Full-duplex

**10. An unauthorized user is a network \_\_\_\_\_ issue.**

- a. Performance
- b. Reliability
- c. Security
- d. All of the above

**answer** (c): Security

**11. Which topology requires a multipoint connection?**

- a. Mesh
- b. Star
- c. Ring
- d. Bus

**answer** (d): Bus

**12. A television broadcast is an example of \_\_\_\_\_ transmission.**

- a. Half-duplex
- b. Full-duplex
- c. Simplex
- d. Automatic

**answer** (c): Simplex

**13. A \_\_\_\_\_ connection provides a dedicated link between two devices.**

- a. Multipoint
- b. Point-to-Point
- c. Primary
- d. Secondary

**answer** (b): Point-to-Point

**14. A cable break in a \_\_\_\_\_ topology stops all transmission.**

- a. Mesh
- b. Star
- c. Primary
- d. Bus

**answer** (d): Bus

## Chapter 2: Network Models

**15. The \_\_\_\_\_ layer changes bits into electromagnetic signals.**

- a. Physical
- b. Transport
- c. None of the above
- d. Data link

**answer** (a): Physical

**16. The physical layer is concerned with the transmission of \_\_\_\_\_ over the physical medium.**

- a. Programs
- b. Protocols
- c. Bits
- d. Dialogs

The correct **answer** is c

**17. Mail services are available to network users through the \_\_\_\_\_ layer.**

- a. Data link
- b. Physical
- c. Application
- d. Transport

The correct **answer** is c

**18. As the data packet moves from the lower to the upper layers, headers are \_\_\_\_\_.**

- a. Added

- b. Rearranged
- c. Modified
- d. Subtracted

The correct **answer** is d

Your **answer** is b

**19. As the data packet moves from the upper to the lower layers, headers are \_\_\_\_\_.**

- a. Removed
- b. Added
- c. Rearranged
- d. Modified

The correct **answer** is b

**20. The \_\_\_\_\_ layer lies between the network layer and the application layer.**

- a. Data link
- b. Physical
- c. Transport
- d. None of the above

The correct **answer** is c

**21. Layer 2 lies between the physical layer and the \_\_\_\_\_ layer.**

- a. Data link
- b. Network
- c. Transport
- d. None of the above

The correct **answer** is b

Your **answer** is b

**22. When data are transmitted from device A to device B, the header from A's layer 4 is read by B's \_\_\_\_\_ layer.**

- a. Application
- b. Physical
- c. Transport
- d. None of the above

The correct **answer** is c

Your **answer** is a

**23. Which layer functions as a liaison between user support layers and network support layers?**

- a. Network layer
- b. Transport layer
- c. Physical layer
- d. Application layer

The correct **answer** is b

**24. What is the main function of the transport layer?**

- a. Process-to-process delivery
- b. Node-to-node delivery
- c. Synchronization
- d. Updating and maintenance of routing tables

The correct **answer** is a

**25. Which of the following is an application layer service?**

- a. Remote log-in
- b. File transfer and access
- c. Mail service
- d. All the above

The correct **answer** is d

**26. The Internet model consists of \_\_\_\_\_ layers.**

- a. Three
- b. Five
- c. Seven
- d. Eight

The correct **answer** is b

**27. The process-to-process delivery of the entire message is the responsibility of the**

\_\_\_\_\_ layer.

- a. Physical
- b. Network
- c. Transport
- d. Application

The correct **answer** is c

**28. The \_\_\_\_\_ layer is the layer closest to the transmission medium.**

- a. Network
- b. Physical
- c. Data link
- d. Transport

The correct **answer** is b

## Chapter 3: Signals

**29. Before data can be transmitted, they must be transformed to \_\_\_\_\_.**

- a. Electromagnetic signals
- b. Periodic signals
- c. Aperiodic signals
- d. Low-frequency sine waves

The correct **answer** is a

**30. When one of the components of a signal has a frequency of zero, the average amplitude of the signal \_\_\_\_\_.**

- a. Is less than zero
- b. Is greater than zero
- c. Is zero
- d. (a) or (b)

The correct **answer** is b

**31. A periodic signal can always be decomposed into \_\_\_\_\_.**

- a. Exactly an odd number of sine waves
- b. A set of sine waves, one of which must have a phase of  $0^\circ$
- c. A set of sine waves
- d. None of the above

The correct **answer** is c

32. A periodic signal completes one cycle in 0.001 s. What is the frequency?

- a. 1 Hz
- b. 100 Hz
- c. 1 KHz
- d. 1 MHz

The correct **answer** is c

33. In a frequency-domain plot, the horizontal axis measures the \_\_\_\_\_.

- a. Frequency
- b. Peak amplitude
- c. Phase
- d. Slope

The correct **answer** is a

34. In a time-domain plot, the vertical axis is a measure of \_\_\_\_\_.

- a. Frequency
- b. Phase
- c. Amplitude
- d. Time

The correct **answer** is c

35. In a time-domain plot, the horizontal axis is a measure of \_\_\_\_\_.

- a. Signal amplitude
- b. Time
- c. Frequency
- d. Phase

The correct **answer** is b

36. If the bandwidth of a signal is 5 KHz and the lowest frequency is 52 KHz, what is the highest frequency?

- a. 5 KHz
- b. 10 KHz
- c. 47 KHz
- d. 57 KHz

The correct **answer** is d

37.

Your **answer** is a

38. What is the bandwidth of a signal that ranges from 40 KHz to 4 MHz?

- a. 3.96 MHz
- b. 36 MHz
- c. 360 KHz
- d. 396 KHz

The correct **answer** is a

39. As frequency increases, the period \_\_\_\_\_.

- a. Decreases
- b. Increases
- c. Remains the same
- d. Doubles

The correct **answer** is a

40. When propagation speed is multiplied by propagation time, we get the \_\_\_\_\_.

- a. Throughput
- b. Wavelength of the signal
- c. Distance a signal or bit has traveled
- d. Distortion factor

The correct **answer** is c

41. Propagation time is \_\_\_\_\_ proportional to distance and \_\_\_\_\_ proportional to propagation speed.

- a. Inversely; directly
- b. Inversely; inversely
- c. Directly; inversely
- d. Directly; directly

The correct **answer** is c

42. Wavelength is \_\_\_\_\_ proportional to propagation speed and \_\_\_\_\_ proportional to period.

- a. Directly; directly
- b. Inversely; directly
- c. Directly; inversely
- d. Inversely; inversely

The correct **answer** is a

43. Which of the following can be determined from a frequency-domain graph of a signal?

- a. Phase
- b. Power
- c. Frequency
- d. All the above

The correct **answer** is c

44. Which of the following can be determined from a frequency-domain graph of a signal?

- a. Phase
- b. Bandwidth
- c. Power

d. All the above

The correct **answer** is b

45. In a frequency-domain plot, the vertical axis measures the \_\_\_\_\_.

- a. Frequency
- b. Peak amplitude
- c. Phase
- d. Slope

The correct **answer** is b

46. Given two sine waves A and B, if the frequency of A is twice that of B, then the period of B is \_\_\_\_\_ that of A.

- a. One-half
- b. Twice
- c. The same as
- d. Indeterminate from

The correct **answer** is b

47. The wavelength of green light in air is \_\_\_\_\_ the wavelength of green light in fiber-optic cable.

- a. Greater than
- b. Less than
- c. Equal to
- d. None of the above

The correct **answer** is b

48. Using the Shannon formula to calculate the data rate for a given channel, if  $C = B$ , then \_\_\_\_\_.

- a. The signal is equal to the noise
- b. The signal is less than the noise
- c. The signal is greater than the noise
- d. Not enough information is given to **answer** the question

The correct **answer** is a

49. A sine wave is \_\_\_\_\_.

- a. Aperiodic and continuous
- b. Periodic and discrete
- c. Aperiodic and discrete
- d. Periodic and continuous

The correct **answer** is d

50. If the maximum amplitude of a sine wave is 2 V, the minimum amplitude is \_\_\_\_\_ V.

- a. 2
- b. 1
- c. -2
- d. Between -2 and 2

The correct **answer** is c

51. A signal is measured at two different points. The power is  $P_1$  at the first point and  $P_2$  at the second point. The dB is 0. This means \_\_\_\_\_.

- a.  $P_2$  is zero
- b.  $P_2$  equals  $P_1$
- c.  $P_2$  is much larger than  $P_1$
- d.  $P_2$  is much smaller than  $P_1$

The correct **answer** is b

52. \_\_\_\_\_ is a type of transmission impairment in which the signal loses strength due to the resistance of the transmission medium.

- a. Distortion
- b. Noise
- c. Decibel
- d. Attenuation

The correct **answer** is d

53. \_\_\_\_\_ is a type of transmission impairment in which the signal loses strength due to the different propagation speeds of each frequency that makes up the signal.

- a. Attenuation
- b. Noise
- c. Distortion
- d. Decibel

The correct **answer** is c

54. \_\_\_\_\_ is a type of transmission impairment in which an outside source such as crosstalk corrupts a signal.

- a. Attenuation
- b. Noise
- c. Distortion
- d. Decibel

The correct **answer** is b

55.

The \_\_\_\_\_ has units of meters/second or kilometers/second.

- a. Throughput
- b. Propagation time
- c. Propagation speed
- d. (b) and (c)

The correct **answer** is c

56. \_\_\_\_\_ has units of bits/second.

- a. Throughput
- b. Propagation speed
- c. Propagation time
- d. (b) and (c)

The correct **answer** is a

57. The \_\_\_\_\_ has units of seconds.

- a. Throughput
- b. Propagation time
- c. Propagation speed
- d. (a) and (b)

The correct **answer** is b

58.

The wavelength of a signal depends on the \_\_\_\_\_.

- a. Frequencies of the signal
- b. Medium
- c. Phase of the signal
- d. (a) and (b)

The correct **answer** is d

## Chapter 4: Encoding and Modulation

59. Which encoding technique attempts to solve the loss of synchronization due to long strings of 0s?

- a. NRZ
- b. BnZS
- c. AMI
- d. (a) and (b)

The correct **answer** is b

60. Block coding can help in \_\_\_\_\_ at the receiver.

- a. Synchronization
- b. Error detection
- c. Attenuation
- d. (a) and (b)

The correct **answer** is d

61. In \_\_\_\_\_ transmission, bits are transmitted simultaneously, each across its own wire.

- a. Parallel
- b. Asynchronous serial
- c. Synchronous serial
- d. (a) and (b)

The correct **answer** is a

62. Unipolar, bipolar, and polar encoding are types of \_\_\_\_\_ encoding.

- a. Block
- b. Line
- c. NRZ
- d. Manchester

The correct **answer** is b

63. \_\_\_\_\_ encoding has a transition at the middle of each bit.

- a. RZ
- b. Manchester
- c. Differential Manchester
- d. All the above

The correct **answer** is d

64. \_\_\_\_\_ encoding has a transition at the beginning of each 0 bit.

- a. Differential Manchester
- b. RZ
- c. Manchester
- d. All the above

The correct **answer** is a

65. PCM is an example of \_\_\_\_\_ conversion.

- a. Analog-to-analog
- b. Analog-to-digital
- c. Digital-to-digital
- d. Digital-to-analog

The correct **answer** is b

66. If the frequency spectrum of a signal has a bandwidth of 500 Hz with the highest frequency at 600 Hz, what should be the sampling rate, according to the Nyquist theorem?

- a. 500 samples/s
- b. 1000 samples/s
- c. 200 samples/s
- d. 1200 samples/s

The correct **answer** is d

67. One factor in the accuracy of a reconstructed PCM signal is the \_\_\_\_\_.

- a. Number of bits used for quantization
- b. Signal bandwidth
- c. Carrier frequency
- d. Baud rate

The correct **answer** is a

68. In asynchronous transmission, the gap time between bytes is \_\_\_\_\_.

- a. Fixed
- b. A function of the data rate
- c. Variable
- d. Zero

The correct **answer** is c

69. Synchronous transmission does not have \_\_\_\_\_.

- a. A start bit
- b. A stop bit
- c. Gaps between bytes
- d. All the above

The correct **answer** is d

70. Which encoding type always has a nonzero average amplitude?

- a. Polar
- b. Bipolar
- c. Unipolar
- d. All the above

The correct **answer** is c

71. Which of the following encoding methods does not provide for synchronization?

- a. Manchester
- b. NRZ-L
- c. RZ
- d. NRZ-I

The correct **answer** is b

72. Which encoding method uses alternating positive and negative values for 1s?

- a. Manchester
- b. AMI
- c. NRZ-I
- d. RZ

The correct **answer** is b

73. In PCM, an analog-to- \_\_\_\_\_ conversion occurs.

- a. Analog
- b. Digital
- c. QAM
- d. Differential

The correct **answer** is b

74. If the maximum value of a PCM signal is 31 and the minimum value is -31, how many bits were used for coding?

- a. 4
- b. 5
- c. 6
- d. 7

The correct **answer** is c

75. RZ encoding involves \_\_\_\_\_ signal levels.

- a. Five
- b. Four
- c. Three
- d. Two

The correct **answer** is c

76. Which quantization level results in a more faithful reproduction of the signal?

- a. 2
- b. 8
- c. 16
- d. 32

The correct **answer** is d

77. In \_\_\_\_\_ transmission, bits are transmitted over a single wire, one at a time.

- a. Asynchronous serial
- b. Synchronous serial
- c. Parallel
- d. (a) and (b)

The correct **answer** is d

78. In \_\_\_\_\_ transmission, a start bit and a stop bit frame a character byte.

- a. Synchronous serial
- b. Asynchronous serial
- c. Parallel

d. (a) and (b)

The correct **answer** is b

79. If a symbol is composed of 3 bits, there are \_\_\_\_\_ data levels.

- a. 2
- b. 4
- c. 8
- d. 16

The correct **answer** is c

80. The Nyquist theorem specifies the minimum sampling rate to be \_\_\_\_\_.

- a. Twice the bandwidth of a signal
- b. Twice the highest frequency of a signal
- c. Equal to the lowest frequency of a signal
- d. Equal to the highest frequency of a signal

The correct **answer** is b

81. Pulse rate is always \_\_\_\_\_ the bit rate.

- a. Less than
- b. Less than or equal to
- c. Greater than
- d. Greater than or equal to

The correct **answer** is b

## Chapter 5: Multiplexing

82. AM and FM are examples of \_\_\_\_\_ modulation.

- a. Analog-to-analog
- b. Analog-to-digital
- c. Digital-to-digital
- d. Digital-to-analog

The correct **answer** is a

Your **answer** is a

83. In QAM, both phase and \_\_\_\_\_ of a carrier frequency are varied.

- a. Frequency
- b. Bit rate
- c. Amplitude
- d. Baud rate

The correct **answer** is c

84. Which of the following is most affected by noise?

- a. PSK
- b. FSK
- c. QAM
- d. ASK

The correct **answer** is d

85. ASK, PSK, FSK, and QAM are examples of \_\_\_\_\_ modulation.

- a. Analog-to-analog
- b. Analog-to-digital
- c. Digital-to-digital
- d. Digital-to-analog

The correct **answer** is d

86. If the baud rate is 400 for a 4-PSK signal, the bit rate is \_\_\_\_\_ bps.

- a. 1600
- b. 100
- c. 800
- d. 400

The correct **answer** is b

87. If the bit rate for an ASK signal is 1200 bps, the baud rate is \_\_\_\_\_.

- a. 300
- b. 400
- c. 600
- d. 1200

The correct **answer** is d

88. As the bit rate of an FSK signal increases, the bandwidth \_\_\_\_\_.

- a. Remains the same
- b. Decreases
- c. Increases
- d. Doubles

The correct **answer** is c

89. In 16-QAM, there are 16 \_\_\_\_\_.

- a. Phases
- b. Combinations of phase and amplitude
- c. Amplitudes
- d. bps

The correct **answer** is b

90. Which modulation technique involves tribits, eight different phase shifts, and one amplitude?

- a. FSK
- b. ASK
- c. 4-PSK
- d. 8-PSK

The correct **answer** is d

91. If the bit rate for an FSK signal is 1200 bps, the baud rate is \_\_\_\_\_.

- a. 300
- b. 400
- c. 600
- d. 1200

The correct **answer** is d

92. If the bit rate for a QAM signal is 3000 bps and a signal unit is represented by a tribit, what is the baud rate?

- a. 300
- b. 400
- c. 1000
- d. 1200

The correct **answer** is c

93. If the baud rate for a QAM signal is 3000 and a signal unit is represented by a tribit, what is the bit rate?

- a. 300
- b. 400
- c. 1000
- d. 9000

The correct **answer** is d

94. If the baud rate for a QAM signal is 1800 and the bit rate is 9000, how many bits are there per signal unit?

- a. 3
- b. 4
- c. 5
- d. 6

The correct **answer** is c

95. Given an AM radio signal with a bandwidth of 10 KHz and the highest-frequency component at 705 KHz, what is the frequency of the carrier signal?

- a. 705 KHz
- b. 700 KHz

- c. 710 KHz
- d. Cannot be determined from given information

The correct **answer** is b

96. A modulated signal is formed by \_\_\_\_\_.
- a. Changing the carrier wave by the modulating signal
  - b. Quantization of the source data
  - c. Changing the modulating signal by the carrier wave
  - d. Sampling at the Nyquist frequency

The correct **answer** is a

97. If FCC regulations are followed, the carrier frequencies of adjacent AM radio stations are \_\_\_\_\_ apart.
- a. 5 KHz
  - b. 10 KHz
  - c. 200 KHz
  - d. 530 KHz

The correct **answer** is b

98. If FCC regulations are followed, \_\_\_\_\_ potential FM stations are theoretically possible in a given area.
- a. 50
  - b. 100
  - c. 133
  - d. 150

The correct **answer** is a

99. When an ASK signal is decomposed, the result is \_\_\_\_\_.
- a. An infinite number of sine waves
  - b. Always one sine wave
  - c. Always two sine waves
  - d. None of the above

The correct **answer** is a

100. The bandwidth of an FM signal requires 10 times the bandwidth of the \_\_\_\_\_ signal.
- a. Bipolar
  - b. Sampling
  - c. Carrier
  - d. Modulating

The correct **answer** is d

101. Modulation of an analog signal can be accomplished through changing the \_\_\_\_\_ of the carrier signal.
- a. Amplitude
  - b. Frequency
  - c. Phase
  - d. Any of the above

The correct **answer** is d

102. For a telephone line, the bandwidth for voice is usually \_\_\_\_\_ the bandwidth for data.
- a. Less than
  - b. Greater than
  - c. Twice
  - d. Equivalent to

The correct **answer** is b

103. For a given bit rate, the minimum bandwidth for ASK is \_\_\_\_\_ the minimum bandwidth for FSK.
- a. Less than
  - b. Equivalent to
  - c. Greater than
  - d. Twice

The correct **answer** is a

104. What is the object of trellis coding?
- a. To narrow the bandwidth

- b. To increase the data rate
- c. To reduce the error rate
- d. To simplify modulation

The correct **answer** is c

105. A modulator converts a(n) \_\_\_\_\_ signal to a(n) \_\_\_\_\_ signal.

- a. Digital; analog
- b. Analog; digital
- c. PSK; FSK
- d. FSK; PSK

The correct **answer** is a

106. A 56K modem can download at a rate of \_\_\_\_\_ Kbps and upload at a rate of \_\_\_\_\_ Kbps.

- a. 56.6; 33.6
- b. 56.6; 56.6
- c. 33.6; 33.6
- d. 33.6; 56.6

The correct **answer** is a

107. For FSK, as the difference between the two carrier frequencies increases, the bandwidth \_\_\_\_\_.

- a. Remains the same
- b. Decreases
- c. Increases
- d. Halves

The correct **answer** is c

108. The bit rate always equals the baud rate in which type of signal?

- a. FSK
- b. QAM
- c. 4-PSK
- d. All the above

The correct **answer** is a

109. Which ITU-T modem standard uses trellis coding?

- a. V.32
- b. V.33
- c. V.34
- d. (a) and (b)

The correct **answer** is a

110. In trellis coding the number of data bits is \_\_\_\_\_ the number of transmitted bits.

- a. Less than
- b. More than
- c. Equal to
- d. Double that of

The correct **answer** is a

Chapter 6: Switching

111. Which multiplexing technique transmits digital signals?

- a. WDM
- b. FDM
- c. TDM
- d. None of the above

The correct **answer** is c

112. Which multiplexing technique shifts each signal to a different carrier frequency?

- a. TDM
- b. FDM
- c. Both (a) and (b)
- d. None of the above

The correct **answer** is b

113. In TDM, for n signal sources of the same data rate, each frame contains \_\_\_\_\_ slots.

- a. 0 to n
- b. n
- c. n + 1
- d. n - 1

The correct **answer** is b

114. In TDM, the transmission rate of the multiplexed path is usually \_\_\_\_\_ the sum of the transmission rates of the signal sources.

- a. 1 less than
- b. Greater than
- c. Less than
- d. Equal to

The correct **answer** is b

115. DS-1 through DS-4 are \_\_\_\_\_ while T-1 through T-4 are \_\_\_\_\_.

- a. Services; signals
- b. Services; lines
- c. Services; multiplexers
- d. Multiplexers; signals

The correct **answer** is b

116. The sharing of a medium and its link by two or more devices is called \_\_\_\_\_.

- a. Modulation
- b. Encoding
- c. Multiplexing
- d. Line discipline

The correct **answer** is c

117. In AT&T's FDM hierarchy, the bandwidth of each group type can be found by multiplying \_\_\_\_\_ and adding extra bandwidth for guard bands.

- a. The sampling rate by 4000 Hz
- b. The number of voice channels by 4000 Hz
- c. The number of voice channels by 8 bits/sample
- d. The sampling rate by 8 bits/sample

The correct **answer** is b

118. Guard bands increase the bandwidth for \_\_\_\_\_.

- a. TDM
- b. FDM
- c. Both (a) and (b)
- d. None of the above

The correct **answer** is b

119. Which multiplexing technique transmits analog signals?

- a. FDM
- b. TDM
- c. WDM
- d. (a) and (c)

The correct **answer** is d

120. In a T-1 line, \_\_\_\_\_ interleaving occurs.

- a. Bit
- b. Byte
- c. DS-0
- d. Switch

The correct **answer** is b

121. Which multiplexing technique involves signals composed of light beams?

- a. WDM

- b. FDM
- c. TDM
- d. None of the above

The correct **answer** is a

Chapter 7: Transmission Media

122. The VLF and LF bands use \_\_\_\_\_ propagation for communications.

- a. Space
- b. Ground
- c. Sky
- d. Line of sight

The correct **answer** is b

123. Category 1 UTP cable is most often used in \_\_\_\_\_ networks.

- a. Infrared
- b. Telephone
- c. Fast Ethernet
- d. Traditional Ethernet

The correct **answer** is b

124. BNC connectors are used by \_\_\_\_\_ cables.

- a. Fiber-optic
- b. UTP
- c. STP
- d. Coaxial

The correct **answer** is d

125. Which of the following is not a guided medium?

- a. Twisted-pair cable
- b. Fiber-optic cable
- c. Atmosphere
- d. Coaxial cable

The correct **answer** is c

126. In an environment with many high-voltage devices, the best transmission medium would be \_\_\_\_\_.

- a. Twisted-pair cable
- b. Coaxial cable
- c. The atmosphere
- d. Optical fiber

The correct **answer** is d

127. \_\_\_\_\_ cable consists of an inner copper core and a second conducting outer sheath.

- a. Coaxial
- b. Twisted-pair
- c. Fiber-optic
- d. Shielded twisted-pair

The correct **answer** is a

128. In fiber optics, the signal source is \_\_\_\_\_ waves.

- a. Very low-frequency
- b. Light
- c. Radio
- d. Infrared

The correct **answer** is b

129. Smoke signals are an example of communication through \_\_\_\_\_.

- a. A guided medium
- b. A refractive medium
- c. An unguided medium
- d. A small or large medium

The correct **answer** is c

130. Which of the following primarily uses guided media?

- a. Cellular telephone system
- b. Satellite communications
- c. Local telephone system
- d. Radio broadcasting

The correct **answer** is c

131. What is the major factor that makes coaxial cable less susceptible to noise than twisted-pair cable?

- a. Outer conductor
- b. Inner conductor
- c. Diameter of cable
- d. Insulating material

The correct **answer** is a

132. The RG number gives us information about \_\_\_\_\_.

- a. Optical fibers
- b. Twisted pairs
- c. Coaxial cables
- d. All the above

The correct **answer** is c

133. Transmission media are usually categorized as \_\_\_\_\_.

- a. Guided or unguided
- b. Fixed or unfixd
- c. Determinate or indeterminate
- d. Metallic or nonmetallic

The correct **answer** is a

134. The \_\_\_\_\_ is an association that sponsors the use of infrared waves.

- a. EIA
- b. IrDA
- c. FCC
- d. PUD

The correct **answer** is b

135. In an optical fiber, the inner core is \_\_\_\_\_ the cladding.

- a. Less dense than
- b. Denser than
- c. The same density as
- d. Another name for

The correct **answer** is b

136. The inner core of an optical fiber is \_\_\_\_\_ in composition.

- a. Copper
- b. Bimetallic
- c. Glass or plastic
- d. Liquid

The correct **answer** is c

137. When a beam of light travels through media of two different densities, if the angle of incidence is greater than the critical angle, \_\_\_\_\_ occurs.

- a. Refraction
- b. Reflection
- c. Incidence
- d. Criticism

The correct **answer** is b

138. In \_\_\_\_\_ propagation, the beam of propagated light is almost horizontal, and the low-density core has a small diameter compared to the cores of the other propagation modes.

- a. Single-mode
- b. Multimode step-index

- c. Multimode graded-index
- d. Multimode single-index

The correct **answer** is a

139. \_\_\_\_\_ is the propagation method subject to the greatest distortion.

- a. Single-mode
- b. Multimode step-index
- c. Multimode graded-index
- d. Multimode single-index

The correct **answer** is b

140. In \_\_\_\_\_ propagation, the core is of varying densities.

- a. Single-mode
- b. Multimode step-index
- c. Multimode graded-index
- d. Multimode single-index

The correct **answer** is c

141. When we talk about unguided media, usually we are referring to \_\_\_\_\_.

- a. Metallic wires
- b. Nonmetallic wires
- c. The air
- d. None of the above

The correct **answer** is c

142. Transmission media are closest to the \_\_\_\_\_ layer.

- a. Application
- b. Physical
- c. Network
- d. Transport

The correct **answer** is b

143. Radio wave and microwave frequencies range from \_\_\_\_\_.

- a. 3 to 300 KHz
- b. 300 KHz to 3 GHz
- c. 3 KHz to 300 GHz
- d. 3 KHz to 3000 GHz

The correct **answer** is c

144. Optical fibers, unlike wire media, are highly resistant to \_\_\_\_\_.

- a. High-frequency transmission
- b. Low-frequency transmission
- c. Refraction
- d. Electromagnetic interference

The correct **answer** is d

145. In \_\_\_\_\_ propagation, low-frequency radio waves hug the earth.

- a. Space
- b. Ground
- c. Sky
- d. Line of sight

The correct **answer** is b

146. When the angle of incidence is \_\_\_\_\_ the critical angle, the light beam bends along the interface.

- a. More than
- b. Less than
- c. Equal to
- d. None of the above

The correct **answer** is c

147. A parabolic dish antenna is a(n) \_\_\_\_\_ antenna.

- a. Omnidirectional

- b. Bidirectional
- c. Horn
- d. Unidirectional

The correct **answer** is d

Chapter 8 : Telephone, Cable, and Satellite Networks

148. The telephone service handled between two LATAs is called \_\_\_\_\_.

- a. An ILEC
- b. An IXC
- c. A CLEC
- d. A POP

The correct **answer** is b

149. How many crosspoints are needed in a single-stage switch with 40 inputs and 50 outputs?

- a. 2000
- b. 90
- c. 50
- d. 40

The correct **answer** is a

150. The \_\_\_\_\_ is a device that connects n inputs to m outputs.

- a. Crossbar
- b. Crosspoint
- c. Modem
- d. RAM

The correct **answer** is a

151. The established telephone company that provided services in a LATA before 1966 and owns the cabling system is called \_\_\_\_\_.

- a. A CLEC
- b. An IXC
- c. An ILEC
- d. A POP

The correct **answer** is c

152. In a crossbar with 1000 crosspoints, approximately how many are in use at any time?

- a. 100
- b. 250
- c. 500
- d. 1000

The correct **answer** is b

153. The \_\_\_\_\_ of a TSI controls the order of delivery of slot values that are stored in RAM.

- a. Crossbar
- b. Crosspoint
- c. Transceiver
- d. Control unit

The correct **answer** is d

154. Which of the following is a time-division switch?

- a. TSI
- b. TDM bus
- c. Crosspoint
- d. (a) and (b)

The correct **answer** is d

155. In a time-division switch, a \_\_\_\_\_ governs the destination of a packet stored in RAM.

- a. Control unit
- b. TDM bus
- c. Crosspoint
- d. Crossbar

The correct **answer** is a

156. A telephone network is an example of a \_\_\_\_\_ network.

- a. Circuit-switched
- b. Packet-switched
- c. Message-switched
- d. None of the above

The correct **answer** is a

157. The local loop has \_\_\_\_\_ cable that connects the subscriber telephone to the nearest end office.

- a. Coaxial
- b. Fiber-optic
- c. Twisted-pair
- d. (b) and (c)

The correct **answer** is c

158. Trunks are transmission media such as \_\_\_\_\_ that handle the telephone communication between offices.

- a. Twisted-pair cable
- b. Fiber-optic cable
- c. Satellite links
- d. (b) and (c)

The correct **answer** is d

159. A new telephone company that provides services in a LATA after 1966 is called \_\_\_\_\_.

- a. An ILEC
- b. An IXC
- c. A POP
- d. A CLEC

The correct **answer** is d

160. If the end office receives two bursts of analog signals with frequencies of 697 and 1477 Hz, then the number \_\_\_\_\_ has been punched.

- a. 1
- b. 2
- c. 3
- d. 4

The correct **answer** is c

161. In \_\_\_\_\_ circuit switching, delivery of data is delayed because data must be stored and retrieved from RAM.

- a. Time-division
- b. Space-division
- c. Virtual
- d. Packet

The correct **answer** is a

162. Data from a computer are \_\_\_\_\_; the local loop handles \_\_\_\_\_ signals.

- a. Digital; digital
- b. Digital; analog
- c. Analog; analog
- d. Analog; digital

The correct **answer** is b

163. To create a \_\_\_\_\_, combine crossbar switches in stages.

- a. TSI
- b. Multistage switch
- c. Crosspoint
- d. Packet switch

The correct **answer** is b

164. A traditional telephone line has a bandwidth of \_\_\_\_\_.

- a. 2000 Hz
- b. 4000 Hz

- c. 2000 MHz
- d. 4000 MHz

The correct **answer** is b

Chapter 9 : Flow and Error Control

165. SONET is a standard for \_\_\_\_\_ networks.

- a. Twisted-pair cable
- b. Fiber-optic cable
- c. Coaxial cable
- d. Ethernet

The correct **answer** is b

166. \_\_\_\_\_ limit the bandwidth of the local loop to 4 KHz.

- a. Fiber nodes
- b. Repeaters
- c. Filters
- d. Hubs

The correct **answer** is c

167. The actual bit rate of ADSL downstream data is \_\_\_\_\_.

- a. 6 to 30 Kbps
- b. 64 Kbps to 1 Mbps
- c. 500 Kbps to 8 Mbps
- d. 31 Kbps to 255 Mbps

The correct **answer** is c

168. \_\_\_\_\_ is a device at the telephone company site that can packetize data to be sent to the ISP server.

- a. A filter
- b. A splitter
- c. A DSLAM
- d. An ADSL modem

The correct **answer** is c

169. The standard for data transmission over an HFC network is called \_\_\_\_\_.

- a. DOCSIS
- b. CMTS
- c. MCNS
- d. ADSL

The correct **answer** is a

170. DMT is a modulation technique that combines elements of \_\_\_\_\_ and \_\_\_\_\_.

- a. FDM; TDM
- b. QDM; QAM
- c. PSK; FSK
- d. FDM; QAM

The correct **answer** is d

171. The \_\_\_\_\_ is an HFC network device installed inside the distribution hub that receives data from the Internet and passes them to the combiner.

- a. DOCSIS
- b. MCNS
- c. CM
- d. CMTS

The correct **answer** is d

172. HDSL encodes data using \_\_\_\_\_.

- a. 6B/8T
- b. 4B/5B
- c. 2B1Q
- d. 1B2Q

The correct **answer** is c

Your **answer** is a

173. \_\_\_\_\_ encoded signal is more susceptible to attenuation than \_\_\_\_\_ encoded signal.

- a. An AMI; a 2B1Q
- b. An AMI; a 2B2Q
- c. A 2B1Q; an AMI
- d. None of the above

The correct **answer** is a

174. Another name for the cable TV office is the \_\_\_\_\_.

- a. Fiber node
- b. Combiner
- c. Head end
- d. Splitter

The correct **answer** is c

175. A traditional cable TV network transmits signals \_\_\_\_\_.

- a. Upstream and downstream
- b. Upstream
- c. Downstream
- d. None of the above

The correct **answer** is c

176. \_\_\_\_\_ was designed as an alternative to the T-1 line.

- a. VDSL
- b. SDSL
- c. HDSL
- d. ADSL

The correct **answer** is c

177. The synchronous payload envelope of an STS-1 frame contains \_\_\_\_\_.

- a. Pointers
- b. User data
- c. Overhead
- d. (b) and (c)

The correct **answer** is d

178. \_\_\_\_\_ has a higher transmission rate in the downstream direction than in the upstream direction.

- a. VDSL
- b. ADSL
- c. SDSL
- d. (a) and (b)

The correct **answer** is d

179. An HFC network uses \_\_\_\_\_ as the medium from the switch to the fiber node.

- a. UTP
- b. STP
- c. Optical fiber
- d. Coaxial cable

The correct **answer** is c

180. In an HFC network, the distribution hub handles the \_\_\_\_\_ of signals.

- a. Modulation
- b. Distribution
- c. Splitting
- d. (a) and (b)

The correct **answer** is d

181. A TV channel in an HFC network needs a \_\_\_\_\_-MHz bandwidth.

- a. 369
- b. 6
- c. 100

d. 250

The correct **answer** is b

182. \_\_\_\_\_ data go from the subscriber to the Internet.

- a. Downstream
- b. Upstream
- c. Midstream
- d. None of the above

The correct **answer** is b

183. In an HFC network, the upstream data are modulated using the \_\_\_\_\_ modulation technique.

- a. PCM
- b. QAM
- c. QPSK
- d. ASK

The correct **answer** is b

184. \_\_\_\_\_ is suitable for businesses that require comparable upstream and downstream data rates.

- a. SDSL
- b. VDSL
- c. ADSL
- d. (a) and (b)

The correct **answer** is a

185. SONET is an acronym for \_\_\_\_\_ Network.

- a. Standard Optical
- b. Symmetric Open
- c. Synchronous Optical
- d. Standard Open

The correct **answer** is c

186. The largest portion of the bandwidth for ADSL carries \_\_\_\_\_.

- a. Voice communication
- b. Downstream data
- c. Upstream data
- d. Control data

The correct **answer** is b

187. In a SONET system, \_\_\_\_\_ can remove signals from a path.

- a. An add/drop multiplexer
- b. A repeater
- c. An STS multiplier
- d. A regenerator

The correct **answer** is a

Chapter 10 : Access Method

188. Which of the following best describes a single-bit error?

- a. A single bit is inverted.
- b. A single bit is inverted per transmission.
- c. A single bit is inverted per data unit.
- d. Any of the above

The correct **answer** is c

189. Which error detection method uses ones complement arithmetic?

- a. Simple parity check
- b. Checksum
- c. Two-dimensional parity check
- d. CRC

The correct **answer** is b

190. Which error detection method consists of just one redundant bit per data unit?

- a. Two-dimensional parity check
- b. CRC
- c. Simple parity check
- d. Checksum

The correct **answer** is c

191. Which error detection method involves polynomials?

- a. CRC
- b. Simple parity check
- c. Two-dimensional parity check
- d. Checksum

The correct **answer** is a

192. If the ASCII character G is sent and the character D is received, what type of error is this?

- a. Single-bit
- b. Multiple-bit
- c. Burst
- d. Recoverable

The correct **answer** is c

193. If the ASCII character H is sent and the character I is received, what type of error is this?

- a. Burst
- b. Recoverable
- c. Single-bit
- d. Multiple-bit

The correct **answer** is c

194. In cyclic redundancy checking, what is the CRC?

- a. The remainder
- b. The divisor
- c. The quotient
- d. The dividend

The correct **answer** is a

195. Which error detection method involves the use of parity bits?

- a. Simple parity check
- b. Two-dimensional parity check
- c. CRC
- d. (a) and (b)

The correct **answer** is d

196. In cyclic redundancy checking, the divisor is \_\_\_\_\_ the CRC.

- a. The same size as
- b. 1 bit more than
- c. 1 bit less than
- d. 2 bits more than

The correct **answer** is b

197. If the data unit is 111111, the divisor 1010, and the remainder 110, what is the dividend at the receiver?

- a. 111111011
- b. 1010110
- c. 111111110
- d. 110111111

The correct **answer** is c

198. Which error detection method consists of a parity bit for each data unit as well as an entire data unit of parity bits?

- a. Simple parity check
- b. Checksum
- c. Two-dimensional parity check
- d. CRC

The correct **answer** is c

199. If the data unit is 111111 and the divisor 1010, what is the dividend at the transmitter?

- a. 1111110000
- b. 111111000
- c. 111111
- d. 1111111010

The correct **answer** is b

200. If odd parity is used for ASCII error detection, the number of 0s per 8-bit symbol is \_\_\_\_\_.

- a. Indeterminate
- b. 42
- c. Even
- d. Odd

The correct **answer** is d

201. In CRC there is no error if the remainder at the receiver is \_\_\_\_\_.

- a. Nonzero
- b. The quotient at the sender
- c. Equal to the remainder at the sender
- d. Zero

The correct **answer** is d

202. At the CRC generator, \_\_\_\_\_ added to the data unit after the division process.

- a. 0s are
- b. 1s are
- c. The CRC remainder is
- d. The polynomial is

The correct **answer** is c

203. The sum of the checksum and data at the receiver is \_\_\_\_\_ if there are no errors.

- a. -0
- b. +0
- c. The complement of the checksum
- d. The complement of the data

The correct **answer** is a

204. In CRC the quotient at the sender \_\_\_\_\_.

- a. Becomes the dividend at the receiver
- b. Becomes the divisor at the receiver
- c. Is the remainder
- d. Is discarded

The correct **answer** is d

205. The Hamming code is a method of \_\_\_\_\_.

- a. Error detection
- b. Error correction
- c. Error encapsulation
- d. (a) and (b)

The correct **answer** is d

206. At the CRC checker, \_\_\_\_\_ means that the data unit is damaged.

- a. A string of alternating 1s and 0s
- b. A nonzero remainder
- c. A string of 0s
- d. A string of 1s

The correct **answer** is b

207. Which error detection method can detect a single-bit error?

- a. Simple parity check
- b. Two-dimensional parity check
- c. CRC
- d. All the above

The correct **answer** is d

208. Which error detection method can detect a burst error?

- a. The parity check
- b. Two-dimensional parity check
- c. CRC
- d. (b) and (c)

The correct **answer** is d

209. At the CRC generator, \_\_\_\_\_ added to the data unit before the division process.

- a. A polynomial is
- b. A CRC remainder is
- c. 0s are
- d. 1s are

The correct **answer** is c

Chapter 11 : Wired Local Area Networks

210. HDLC is an acronym for \_\_\_\_\_.

- a. High-duplex line communication
- b. Half-duplex digital link combination
- c. High-level data link control
- d. Host double-level circuit

The correct **answer** is c

211. Flow control is needed to prevent \_\_\_\_\_.

- a. Overflow of the sender buffer
- b. Overflow of the receiver buffer
- c. Bit errors
- d. Collision between sender and receiver

The correct **answer** is b

212. In a Go-Back-N ARQ, if the window size is 63, what is the range of sequence numbers?

- a. 1 to 63
- b. 1 to 64
- c. 0 to 63
- d. 0 to 64

The correct **answer** is c

213. For a sliding window of size  $n - 1$  ( $n$  sequence numbers), there can be a maximum of \_\_\_\_\_ frames sent but unacknowledged.

- a. 0
- b.  $n$
- c.  $n - 1$
- d.  $n + 1$

The correct **answer** is b

214. When data and acknowledgment are sent on the same frame, this is called \_\_\_\_\_.

- a. Backpacking
- b. Piggypacking
- c. Piggybacking
- d. A good idea

The correct **answer** is c

215. In \_\_\_\_\_ ARQ, if a NAK is received, only the specific damaged or lost frame is retransmitted.

- a. Go-Back-N
- b. Stop-and-Wait
- c. Selective Repeat
- d. (a) and (b)

The correct **answer** is a

216. ARQ stands for \_\_\_\_\_.

- a. Automatic repeat request

- b. Automatic retransmission request
- c. Acknowledge repeat request
- d. Automatic repeat quantization

The correct **answer** is a

217. In Go-Back-N ARQ, if frames 4, 5, and 6 are received successfully, the receiver may send an ACK \_\_\_\_\_ to the sender.

- a. 5
- b. 6
- c. 7
- d. Any of the above

The correct **answer** is d

218. The shortest frame in HDLC protocol is usually the \_\_\_\_\_ frame.

- a. Information
- b. Management
- c. Supervisory
- d. None of the above

The correct **answer** is c

219. The address field of a frame in HDLC protocol contains the address of the \_\_\_\_\_ station.

- a. Primary
- b. Secondary
- c. Tertiary
- d. (a) or (b)

The correct **answer** is b

220. The HDLC \_\_\_\_\_ field defines the beginning and end of a frame.

- a. Address
- b. Control
- c. Flag
- d. FCS

The correct **answer** is c

221. A timer is set when \_\_\_\_\_ is (are) sent out.

- a. An ACK
- b. A NAK
- c. A data frame
- d. All the above

The correct **answer** is c

222. For Stop-and-Wait ARQ, for n data packets sent, \_\_\_\_\_ acknowledgments are needed.

- a.  $n - 1$
- b.  $n + 1$
- c. n
- d.  $2n$

The correct **answer** is c

223. What is present in all HDLC control fields?

- a. N(R)
- b. N(S)
- c. Code bits
- d. P/F bit

The correct **answer** is d

Chapter 12 : Wireless Local Area Networks

224. According to the PPP transition state diagram, options are negotiated in the \_\_\_\_\_ state.

- a. Networking
- b. Terminating
- c. Establishing
- d. Authenticating

The correct **answer** is c

225. According to the PPP transition state diagram, verification of user identification occurs in the \_\_\_\_\_ state.

- a. Networking
- b. Terminating
- c. Establishing
- d. Authenticating

The correct **answer** is d

226. PAP requires \_\_\_\_\_ and \_\_\_\_\_ from the user.

- a. A password; a calculated value
- b. Authentication identification; a calculated value
- c. Authentication identification; a password
- d. A challenge value; a password

The correct **answer** is c

227. According to the PPP transition state diagram, the link is disconnected in the \_\_\_\_\_ state.

- a. Networking
- b. Terminating
- c. Establishing
- d. Authenticating

The correct **answer** is b

228. In the PPP frame, the \_\_\_\_\_ field defines the contents of the data field.

- a. FCS
- b. Flag
- c. Control
- d. Protocol

The correct **answer** is d

229. According to the PPP transition state diagram, exchange of user control and data packets occurs in the \_\_\_\_\_ state.

- a. Networking
- b. Terminating
- c. Establishing
- d. Authenticating

The correct **answer** is a

230. \_\_\_\_\_, an (a) \_\_\_\_\_ protocol, establishes and terminates a network layer connection for IP packets.

- a. CHAP; NCP
- b. IPCP; NCP
- c. NCP; IPCP
- d. SLIP; PPP

The correct **answer** is b

231. In the PPP frame, the \_\_\_\_\_ field is similar to that of the U-frame in HDLC.

- a. Flag
- b. Protocol
- c. FCS
- d. Control

The correct **answer** is d

232. In the PPP frame, the \_\_\_\_\_ field has a value of 11111111 to indicate the broadcast address of HDLC.

- a. Protocol
- b. Address
- c. Control
- d. FCS

The correct **answer** is b

233. What is the purpose of LCP packets?

- a. Configuration
- b. Termination
- c. Option negotiation
- d. All the above

The correct **answer** is d

234. \_\_\_\_\_ is a three-way handshake for user verification.

- a. PPP
- b. CHAP
- c. PAP
- d. (b) and (c)

The correct **answer** is b

235. A PAP packet and a CHAP packet can be distinguished by the value of the \_\_\_\_\_ field of the PPP frame.

- a. Protocol
- b. FCS
- c. Address
- d. Control

The correct **answer** is d

236. In the PPP frame, the \_\_\_\_\_ field is for error control.

- a. FCS
- b. Flag
- c. Control
- d. Protocol

The correct **answer** is a

237. CHAP authentication, the user takes the system's \_\_\_\_\_ and its own \_\_\_\_\_ to create a result that is then sent to the system.

- a. Authentication identification; password
- b. Password; authentication identification
- c. Challenge value; password
- d. Password; challenge value

The correct **answer** is c

238. If an FDMA network has eight stations, the medium bandwidth has \_\_\_\_\_ bands.

- a. 1
- b. 2
- c. 8
- d. 16

The correct **answer** is c

239. In the \_\_\_\_\_ random-access method there is no collision.

- a. CSMA/CD
- b. CSMA/CA
- c. ALOHA
- d. Token-passing

The correct **answer** is b

240. In the 1-persistent approach, when a station finds an idle line, it \_\_\_\_\_.

- a. Sends immediately
- b. Waits 0.1 s before sending
- c. Waits 1 s before sending
- d. Waits a time equal to  $1 - p$  before sending

The correct **answer** is a

241. \_\_\_\_\_ requires one primary station and one or more secondary stations.

- a. Token ring
- b. Reservation
- c. Polling
- d. CSMA

The correct **answer** is c

242. In the p-persistent approach, when a station finds an idle line, it \_\_\_\_\_.

- a. Sends immediately
- b. Waits 1 s before sending

- c. Sends with probability  $1 - p$
- d. Sends with probability  $p$

The correct **answer** is d

243. A network using the CSMA random-access method with  $p$  equal to 0.25 will send \_\_\_\_\_ percent of the time after accessing an idle line.

- a. 50
- b. 75
- c. 100
- d. 25

The correct **answer** is d

244. The 1-persistent approach can be considered a special case of the  $p$ -persistent approach with  $p$  equal to \_\_\_\_\_.

- a. 1.0
- b. 2.0
- c. 0.1
- d. 0.5

The correct **answer** is a

245. \_\_\_\_\_ is a random-access protocol.

- a. FDMA
- b. CDMA
- c. MA
- d. Polling

The correct **answer** is c

246. In the reservation access method, if there are 10 stations on a network, then there are \_\_\_\_\_ reservation minislots in the reservation frame.

- a. 10
- b. 11
- c. 5
- d. 9

The correct **answer** is a

247. A Walsh table for 16 stations has a chip sequence of \_\_\_\_\_ chips.

- a. 16
- b. 32
- c. 4
- d. 8

The correct **answer** is a

248. \_\_\_\_\_ is a controlled-access protocol.

- a. FDMA
- b. TDMA
- c. CSMA
- d. Reservation

The correct **answer** is d

249. \_\_\_\_\_ is (are) a channelization protocol.

- a. FDMA
- b. TDMA
- c. CDMA
- d. All the above

The correct **answer** is d

250. \_\_\_\_\_ is the access protocol used by traditional Ethernet.

- a. Token ring
- b. CSMA
- c. CSMA/CD
- d. CSMA/CA

The correct **answer** is c

251. The most primitive random access method is \_\_\_\_\_.

- a. Channelization
- b. ALOHA
- c. CSMA
- d. Token passing

The correct **answer** is b

252. When a collision is detected in a network using CSMA/CD, \_\_\_\_\_.

- a. The frame is immediately resent
- b. The backoff value is decremented by 1
- c. A jam signal is sent by the station
- d. The backoff value is set to 0

The correct **answer** is c

253. In the \_\_\_\_\_ random-access method, stations do not sense the medium.

- a. CSMA/CA
- b. ALOHA
- c. CSMA/CD
- d. Ethernet

The correct **answer** is b

254. When a primary device asks a secondary device if it has data to send, this is called \_\_\_\_\_.

- a. Backing off
- b. Polling
- c. Selecting
- d. Reserving

The correct **answer** is b

255. If a TDMA network has eight stations, the medium bandwidth has \_\_\_\_\_ bands.

- a. 1
- b. 2
- c. 8
- d. 16

The correct **answer** is a

256. If a CDMA network has eight stations, the medium bandwidth has \_\_\_\_\_ bands.

- a. 1
- b. 2
- c. 8
- d. 16

The correct **answer** is a

257. If an Ethernet destination address is 08-07-06-05-44-33, then this is a \_\_\_\_\_ address.

- a. Broadcast
- b. Unicast
- c. Multicast
- d. Any of the above

The correct **answer** is b

258. What is the hexadecimal equivalent of the Ethernet address 01011010 00010001 01010101 00011000 10101010 00001111?

- a. 5A-11-55-18-AA-0F
- b. 5A-88-AA-18-55-F0
- c. 5A-81-BA-81-AA-0F
- d. 5A-18-5A-18-55-0F

The correct **answer** is a

259. Which of the following could not be an Ethernet source address?

- a. 8A-7B-6C-DE-10-00
- b. 8B-32-21-21-4D-34
- c. EE-AA-C1-23-45-32
- d. 46-56-21-1A-DE-F4

The correct **answer** is b

260. What is the efficiency of 4B/5B block encoding?

- a. 60 percent
- b. 80 percent
- c. 20 percent
- d. 40 percent

The correct **answer** is b

261. Which of the following could not be an Ethernet unicast destination?

- a. 44-AA-C1-23-45-32
- b. 46-56-21-1A-DE-F4
- c. 48-32-21-21-4D-34
- d. 43-7B-6C-DE-10-00

The correct **answer** is d

262. What is the efficiency of 8B/10B encoding?

- a. 80 percent
- b. 20 percent
- c. 40 percent
- d. 60 percent

The correct **answer** is a

263. A 10-station Ethernet LAN uses a \_\_\_\_\_-port bridge if the effective average data rate for each station is 2 Mbps.

- a. 10
- b. 1
- c. 2
- d. 5

The correct **answer** is d

264. A \_\_\_\_\_-station Ethernet LAN uses a four-port bridge. Each station has an effective average data rate of 1.25 Mbps.

- a. 160
- b. 80
- c. 40
- d. 32

The correct **answer** is d

265. An 80-station traditional Ethernet is divided into four collision domains. This means that a maximum of \_\_\_\_\_ stations contend for medium access at any one time.

- a. 20
- b. 76
- c. 80
- d. 320

The correct **answer** is a

266. If an Ethernet destination address is 07-01-02-03-04-05, then this is a \_\_\_\_\_ address.

- a. Unicast
- b. Broadcast
- c. Multicast
- d. Any of the above

The correct **answer** is c

267. What is the efficiency of a frame in half-duplex Gigabit Ethernet carrying 46 bytes of data?

- a. 97 percent
- b. 70 percent
- c. 56 percent
- d. 12 percent

The correct **answer** is b

268. Which of the following could not be an Ethernet multicast destination?

- a. B7-7B-6C-DE-10-00
- b. 7C-56-21-1A-DE-F4

c. 7B-AA-C1-23-45-32

d. 83-32-21-21-4D-34

The correct **answer** is b

269. Which of the following is a four-wire Gigabit Ethernet implementation?

a. 1000Base-SX

b. 1000Base-LX

c. 1000Base-T

d. 1000Base-CX

The correct **answer** is c

270. Forty stations are on an Ethernet LAN. A 10-port bridge segments the LAN. What is the effective average data rate of each station?

a. 1.0 Mbps

b. 2.5 Mbps

c. 2.0 Mbps

d. 5.0 Mbps

The correct **answer** is b

271. A wireless LAN using FHSS hops 10 times per cycle. If the bandwidth of the original signal is 10 MHz and 2 GHz is the lowest frequency, the highest frequency of the system is \_\_\_\_\_ GHz.

a. 1.0

b. 2.0

c. 2.1

d. 3.0

The correct **answer** is c

272. An FHSS wireless LAN has a spread spectrum of 1 GHz. The bandwidth of the original signal is 250 MHz, and there are \_\_\_\_\_ hops per cycle.

a. 4

b. 3

c. 2

d. 1

The correct **answer** is a

273. A wireless LAN using FHSS hops 10 times per cycle. If the bandwidth of the original signal is 10 MHz, the spread spectrum is \_\_\_\_\_ MHz.

a. 1000

b. 10,000

c. 10

d. 100

The correct **answer** is d

274. A wireless LAN using DSSS with an 8-bit chip code needs \_\_\_\_\_ MHz for sending data that originally required a 10-MHz bandwidth.

a. 20

b. 80

c. 2

d. 8

The correct **answer** is b

275. A wireless LAN using DSSS with \_\_\_\_\_-bit chip code needs 320 MHz for sending data that originally required a 20-MHz bandwidth.

a. A 2

b. A 16

c. A 32

d. An 8

The correct **answer** is b

276. A wireless LAN using DSSS with a 4-bit chip code needs 10 MHz for sending data that originally required a \_\_\_\_\_-MHz bandwidth.

a. 20

- b. 25
- c. 40
- d. 2.5

The correct **answer** is d

277. In an ESS the \_\_\_\_\_ station is not mobile.

- a. BSS
- b. AP
- c. Server
- d. None of the above

The correct **answer** is b

278. In an ESS the \_\_\_\_\_ stations are part of a wired LAN.

- a. BSS
- b. AP
- c. Server
- d. All the above

The correct **answer** is b

279. A station with \_\_\_\_\_ mobility is either stationary or moving only inside a BSS.

- a. No-transition
- b. BSS
- c. ESS
- d. (a) and (b)

The correct **answer** is a

280. \_\_\_\_\_ combine to form a scatternet.

- a. APs
- b. Piconets
- c. BSSs
- d. ESSs

The correct **answer** is b

281. Bluetooth uses \_\_\_\_\_ in the physical layer.

- a. DSSS
- b. DHSS
- c. FHSS
- d. OFDM

The correct **answer** is c

282. A \_\_\_\_\_ frame usually precedes a CTS frame.

- a. SIFS
- b. RTS
- c. DIFS
- d. Any of the above

The correct **answer** is b

283. A station with \_\_\_\_\_ mobility can move from one BSS to another.

- a. No-transition
- b. ESS-transition
- c. BSS-transition
- d. (b) and (c)

The correct **answer** is c

284. A station with \_\_\_\_\_ mobility can move from one ESS to another.

- a. No-transition
- b. ESS-transition
- c. BSS-transition
- d. (b) and (c)

The correct **answer** is b

285. A \_\_\_\_\_ frame usually precedes an RTS frame.

- a. DIFS
- b. CIFS
- c. CTS
- d. None of the above

The correct **answer** is d

286. Wireless transmission is \_\_\_\_\_ prone to error than/as wired transmission.

- a. Less
- b. More
- c. Half as
- d. None of the above

The correct **answer** is b

287. Which MAC sublayer does IEEE 802.11 define?

- a. LLC
- b. PCF
- c. DCF
- d. (b) and (c)

The correct **answer** is d

288. What is the basic access method for wireless LANs as defined by IEEE 802.11?

- a. LLC
- b. PCF
- c. DCF
- d. BFD

The correct **answer** is c

289. The access method for wireless LANs as defined by IEEE 802.11 is based on \_\_\_\_\_.

- a. Token passing
- b. CSMA
- c. CSMA/CD
- d. CSMA/CA

The correct **answer** is d

290. FHSS, DSSS, and OFDM are \_\_\_\_\_ layer specifications.

- a. Data link
- b. Network
- c. Physical
- d. Transport

The correct **answer** is c

291. Stations do not sense the medium during \_\_\_\_\_ time.

- a. SIFS
- b. NAV
- c. RTS
- d. CTS

The correct **answer** is b

292. A Bluetooth frame needs \_\_\_\_\_  $\mu$ s for hopping and control mechanisms.

- a. 3
- b. 625
- c. 259
- d. A multiple of 259

The correct **answer** is c

293. In the \_\_\_\_\_ method, the sender hops from frequency to frequency in a specific order.

- a. DSSS
- b. FHSS
- c. OFDM
- d. HR-DSSS

The correct **answer** is b

294. A wireless LAN uses \_\_\_\_\_ frames for acknowledgment.

- a. Management
- b. Data
- c. Control
- d. None of the above

The correct **answer** is c

295. A wireless LAN uses \_\_\_\_\_ frames for the initial communication between stations and the access points.

- a. Control
- b. Data
- c. Management
- d. None of the above

The correct **answer** is c

296. A Bluetooth network can have \_\_\_\_\_ master(s).

- a. One
- b. Two
- c. Three
- d. Eight

The correct **answer** is a

297. A bridge forwards or filters a frame by comparing the information in its address table to the frame's \_\_\_\_\_.

- a. Source node's physical address
- b. Layer 2 destination address
- c. Layer 2 source address
- d. Layer 3 destination address

The correct **answer** is b

298. Repeaters function in the \_\_\_\_\_ layer(s).

- a. Network
- b. Physical (MAC)
- c. Data link
- d. (a) and (b)

The correct **answer** is b

299. A \_\_\_\_\_ is actually a multiport repeater.

- a. Hub
- b. Bridge
- c. Router
- d. VLAN

The correct **answer** is a

300. A repeater takes a weakened or corrupted signal and \_\_\_\_\_ it.

- a. Resamples
- b. Reroutes
- c. Amplifies
- d. Regenerates

The correct **answer** is d

301. A bridge has access to the \_\_\_\_\_ address of a station on the same network.

- a. Network
- b. Service access point
- c. Physical (MAC)
- d. All the above

The correct **answer** is c

302. The bridge with the least-cost path between the LAN and the root bridge is called the \_\_\_\_\_ bridge.

- a. Forwarding
- b. Designated
- c. Blocking
- d. (a) and (b)

The correct **answer** is b

303. A system with redundant bridges might have a problem with \_\_\_\_\_ in the system.

- a. Filters
- b. Spanning trees
- c. Loops
- d. All the above

The correct **answer** is c

304. Bridges function in the \_\_\_\_\_ layer(s).

- a. Physical (MAC)
- b. Data link
- c. Network
- d. (a) and (b)

The correct **answer** is d

305. In a VLAN, stations are separated into groups by \_\_\_\_\_.

- a. Software methods
- b. Location
- c. Physical methods
- d. Switches

The correct **answer** is a

306. A bridge can \_\_\_\_\_.

- a. Filter a frame
- b. Forward a frame
- c. Extend a LAN
- d. Do all the above

The correct **answer** is d

307. A \_\_\_\_\_ bridge has the smallest ID.

- a. Designated
- b. Forwarding
- c. Blocking
- d. Root

The correct **answer** is d

308. A bridge never forwards frames out of the \_\_\_\_\_ port.

- a. Root
- b. Designated
- c. Blocking
- d. Forwarding

The correct **answer** is c

309. Which type of bridge builds and updates its tables from address information on frames?

- a. Transparent
- b. Simple
- c. (a) and (b)
- d. None of the above

The correct **answer** is a

310. VLAN technology divides a LAN into \_\_\_\_\_ groups.

- a. Multiplexed
- b. Framed
- c. Physical
- d. Logical

The correct **answer** is d

311. Which of the following is a connecting device?

- a. Bridge
- b. Repeater
- c. Hub
- d. All the above

The correct **answer** is d

312. Which station characteristic can be used to group stations into a VLAN?

- a. Port numbers
- b. MAC addresses
- c. IP addresses
- d. All the above

The correct **answer** is d

313. \_\_\_\_\_ is a first-generation cellular phone system.

- a. GSM
- b. IS-95
- c. AMPS
- d. D-AMPS

The correct **answer** is c

314. AMPS uses \_\_\_\_\_ for modulation.

- a. FM
- b. FSK
- c. PM
- d. (a) and (b)

The correct **answer** is d

315. \_\_\_\_\_ separates the AMPS voice channels.

- a. CDMA
- b. TDMA
- c. FDMA
- d. (b) and (c)

The correct **answer** is c

316. \_\_\_\_\_ is a cellular telephone system popular in Europe.

- a. GSM
- b. D-AMPS
- c. IS-95
- d. AMPS

The correct **answer** is a

317. D-AMPS uses \_\_\_\_\_ for multiplexing.

- a. CDMA
- b. TDMA
- c. FDMA
- d. (b) and (c)

The correct **answer** is d

318. GSM uses \_\_\_\_\_ for multiplexing.

- a. CDMA
- b. TDMA
- c. FDMA
- d. (b) and (c)

The correct **answer** is d

319. DSSS is used by the \_\_\_\_\_ cellular phone system.

- a. AMPS
- b. IS-95
- c. D-AMPS
- d. GSM

The correct **answer** is b

320. \_\_\_\_\_ base stations use GPS for synchronization.

- a. GSM
- b. IS-95
- c. AMPS

d. D-AMPS

The correct **answer** is b

321. \_\_\_\_\_ will have 288 satellites in 12 polar orbits.

- a. Teledesic
- b. Globalstar
- c. Iridium
- d. GPS

The correct **answer** is a

322. IS-95 has a frequency reuse factor of \_\_\_\_\_.

- a. 7
- b. 95
- c. 1
- d. 5

The correct **answer** is c

323. The path that a satellite makes around the world is called \_\_\_\_\_.

- a. An orbit
- b. A period
- c. A footprint
- d. An uplink

The correct **answer** is a

324. A GEO satellite has \_\_\_\_\_ orbit.

- a. A polar
- b. An inclined
- c. An equilateral
- d. An equatorial

The correct **answer** is d

325. Which orbit has the highest altitude?

- a. LEO
- b. GEO
- c. MEO
- d. HEO

The correct **answer** is b

326. \_\_\_\_\_ is a second-generation cellular phone system.

- a. D-AMPS
- b. GSM
- c. IS-95
- d. All the above

The correct **answer** is d

327. A \_\_\_\_\_ is a computerized center that is responsible for connecting calls, recording call information, and billing.

- a. Cell
- b. Mobile station
- c. Base station
- d. Mobile switching center

The correct **answer** is d

328. \_\_\_\_\_ has 48 satellites in six polar orbits.

- a. Iridium
- b. Teledesic
- c. Globalstar
- d. GPS

The correct **answer** is c

329. The signal from a satellite is aimed at a specific area called the \_\_\_\_\_.

- a. Orbit
- b. Period

- c. Footprint
- d. Uplink

The correct **answer** is c

330. In \_\_\_\_\_, a mobile station always communicates with just one base station.

- a. Roaming
- b. A roaming handoff
- c. A hard handoff
- d. A soft handoff

The correct **answer** is c

331. MEO satellites orbit \_\_\_\_\_ Van Allen belts.

- a. In the
- b. Above both
- c. Below both
- d. Between the

The correct **answer** is d

332. \_\_\_\_\_ is often used for navigation purposes.

- a. GPS
- b. AMPS
- c. IS-95
- d. Iridium

The correct **answer** is a

333. An LEO satellite has \_\_\_\_\_ orbit.

- a. An equatorial
- b. A polar
- c. An inclined
- d. All the above

The correct **answer** is b

334. Teledesic is a \_\_\_\_\_ LEO satellite system.

- a. Passband
- b. Broadband
- c. Little
- d. Big

The correct **answer** is b

335. \_\_\_\_\_ has 66 satellites in six LEOs.

- a. Globalstar
- b. Teledesic
- c. GPS
- d. Iridium

The correct **answer** is d

336. Transmission from the Earth to the satellite is called the \_\_\_\_\_.

- a. Downlink
- b. Uplink
- c. Footlink
- d. Up print

The correct **answer** is b

337. The \_\_\_\_\_ is not used for voice communication.

- a. GPS
- b. Iridium system
- c. IS-95 system
- d. Globalstar system

The correct **answer** is a

338. \_\_\_\_\_ is a Frame Relay option that transmits voice through the network.

- a. LMI

- b. FRAD
- c. VOFR
- d. DLCI

The correct **answer** is c

339. Frame Relay provides \_\_\_\_\_ connections.

- a. PVC
- b. SVC
- c. (a) and (b)
- d. None of the above

The correct **answer** is c

340. Routing and switching in Frame Relay are performed by the \_\_\_\_\_ layer.

- a. Physical
- b. Network
- c. Data link
- d. (b) and (c)

The correct **answer** is c

341. Frame Relay is unsuitable for \_\_\_\_\_ due to possible delays in transmission resulting from variable frame sizes.

- a. File transfers
- b. Real-time video
- c. Fixed-rate data communication
- d. All the above

The correct **answer** is b

342. The Frame Relay address field is \_\_\_\_\_ in length.

- a. 4 bytes
- b. 2 bytes
- c. 3 bytes
- d. Any of the above

The correct **answer** is d

343. Because ATM \_\_\_\_\_, which means that cells follow the same path, the cells do not usually arrive out of order.

- a. Is asynchronous
- b. Uses virtual circuit routing
- c. Is multiplexed
- d. Is a network

The correct **answer** is b

344. \_\_\_\_\_ is a protocol to control and manage interfaces in Frame Relay networks.

- a. FRAD
- b. DLCI
- c. LMI
- d. VOFR

The correct **answer** is c

345. Frame Relay operates in the \_\_\_\_\_.

- a. Physical and data link layers
- b. Physical, data link, and network layers
- c. Physical layer
- d. Data link layer

The correct **answer** is a

346. In the data link layer, Frame Relay uses \_\_\_\_\_.

- a. A simplified HDLC protocol
- b. LAPB
- c. BSC protocol
- d. Any ANSI standard protocol

The correct **answer** is a

347. The VPI of an NNI is \_\_\_\_\_ bits in length.

- a. 16
- b. 8
- c. 12
- d. 24

The correct **answer** is c

348. In data communications, ATM is an acronym for \_\_\_\_\_.

- a. Automated Teller Machine
- b. Automatic Transmission Model
- c. Asynchronous Transfer Mode
- d. Asynchronous Telecommunication Method

The correct **answer** is c

349. Which AAL type is designed to support SEAL?

- a. AAL1
- b. AAL2
- c. AAL3/4
- d. AAL5

The correct **answer** is d

350. Which layer in ATM protocol reformats the data received from other networks?

- a. Physical
- b. Application adaptation
- c. Data adaptation
- d. ATM

The correct **answer** is b

351. Which layer in ATM protocol has a 53-byte cell as an end product?

- a. ATM
- b. Application adaptation
- c. Physical
- d. Cell transformation

The correct **answer** is a

352. Which AAL type is designed to support a data stream that has a constant bit rate?

- a. AAL1
- b. AAL2
- c. AAL3/4
- d. AAL5

The correct **answer** is a

353. The VPI of a UNI is \_\_\_\_\_ bits in length.

- a. 12
- b. 16
- c. 24
- d. 8

The correct **answer** is d

354. In an ATM network, all cells belonging to a single message follow the same \_\_\_\_\_ and remain in their original order until they reach their destination.

- a. Virtual circuit
- b. Transmission path
- c. Virtual path
- d. None of the above

The correct **answer** is a

355. A device called a(n) \_\_\_\_\_ allows frames from an ATM network to be transmitted across a Frame Relay network.

- a. FRAD
- b. LMI
- c. VOFR
- d. DLCI

The correct **answer** is a

356. A \_\_\_\_\_ provides a connection or a set of connections between switches.

- a. Transmission path
- b. Virtual circuit
- c. Virtual path
- d. None of the above

The correct **answer** is b

357. A \_\_\_\_\_ is the physical connection between an endpoint and a switch or between two switches.

- a. Virtual path
- b. Transmission path
- c. Virtual circuit
- d. None of the above

The correct **answer** is b

358. On a network that uses NAT, the \_\_\_\_\_ has a translation table.

- a. Router
- b. Switch
- c. Server
- d. None of the above

The correct **answer** is a

359. Identify the class of IP address 229.1.2.3.

- a. Class A
- b. Class B
- c. Class C
- d. Class D

The correct **answer** is d

360. On a network that uses NAT, \_\_\_\_\_ initiates the communication.

- a. An internal host
- b. An external host
- c. The router
- d. (a) or (b)

The correct **answer** is a

361. A subnet mask in class B can have \_\_\_\_\_ 1s with the remaining bits 0s.

- a. Nine
- b. Seventeen
- c. Three
- d. Fourteen

The correct **answer** is b

362. A subnet mask in class C can have \_\_\_\_\_ 1s with the remaining bits 0s.

- a. Twenty-five
- b. Twelve
- c. Seven
- d. Ten

The correct **answer** is a

363. Identify the class of IP address 4.5.6.7.

- a. Class A
- b. Class B
- c. Class C
- d. Class D

The correct **answer** is a

364. Identify the class of IP address 191.1.2.3.

- a. Class A
- b. Class B
- c. Class C
- d. Class D

The correct **answer** is b

365. A subnet mask in class A can have \_\_\_\_\_ 1s with the remaining bits 0s.

- a. Nine
- b. Four
- c. Thirty-three
- d. Three

The correct **answer** is a

366. Class \_\_\_\_\_ has the greatest number of hosts per given network address.

- a. A
- b. B
- c. C
- d. D

The correct **answer** is a

367. A subnet mask in class B has nineteen 1s. How many subnets does it define?

- a. 128
- b. 8
- c. 32
- d. 64

The correct **answer** is b

368. In \_\_\_\_\_ routing, the full IP address of a destination is given in the routing table.

- a. Next-hop
- b. Host-specific
- c. Network-specific
- d. Default

The correct **answer** is b

369. A subnet mask in class C has twenty-five 1s. How many subnets does it define?

- a. 0
- b. 2
- c. 8
- d. 16

The correct **answer** is b

370. Given the IP address 180.25.21.172 and the subnet mask 255.255.192.0, what is the subnet address?

- a. 180.25.21.0
- b. 180.25.8.0
- c. 180.25.0.0
- d. 180.0.0.0

The correct **answer** is c

371. Given the IP address 18.250.31.14 and the subnet mask 255.240.0.0, what is the subnet address?

- a. 18.9.0.14
- b. 18.0.0.14
- c. 18.31.0.14
- d. 18.240.0.0

The correct **answer** is d

372. \_\_\_\_\_ is a client-server program that provides an IP address, subnet mask, IP address of a router, and IP address of a name server to a computer.

- a. NAT
- b. DHCP
- c. CIDR
- d. ISP

The correct **answer** is b

373. In \_\_\_\_\_, each packet of a message need not follow the same path from sender to receiver.

- a. The virtual approach to packet switching
- b. The datagram approach to packet switching

- c. Message switching
- d. None of the above

The correct **answer** is b

374. An IP address consists of \_\_\_\_\_ bits.

- a. 8
- b. 32
- c. 4
- d. Any of the above

The correct **answer** is b

375. On a network that uses NAT, the router can use \_\_\_\_\_ global address(es).

- a. A pool of
- b. One
- c. Two
- d. None of the above

The correct **answer** is a

376. In \_\_\_\_\_ routing, the mask and destination addresses are both 0.0.0.0 in the routing table.

- a. Default
- b. Next-hop
- c. Network-specific
- d. Host-specific

The correct **answer** is a

377. A subnet mask in class A has fourteen 1s. How many subnets does it define?

- a. 64
- b. 128
- c. 32
- d. 8

The correct **answer** is a

378. In which type of switching do all the packets of a message follow the same channels of a path?

- a. Virtual circuit packet switching
- b. Message switching
- c. Datagram packet switching
- d. None of the above

The correct **answer** is a

379. In \_\_\_\_\_ routing, the destination address is a network address in the routing table.

- a. Network-specific
- b. Host-specific
- c. Next-hop
- d. Default

The correct **answer** is a

380. Given the IP address 201.14.78.65 and the subnet mask 255.255.255.224, what is the subnet address?

- a. 201.14.78.64
- b. 201.14.78.32
- c. 201.14.78.65
- d. 201.14.78.12

The correct **answer** is a

381. In error reporting the encapsulated ICMP packet goes to \_\_\_\_\_.

- a. The receiver
- b. A router
- c. The sender
- d. Any of the above

The correct **answer** is c

382. When the hop-count field reaches zero and the destination has not been reached, a \_\_\_\_\_ error message is sent.

- a. Destination-unreachable

- b. Redirection
- c. Time-exceeded
- d. Parameter-problem

The correct **answer** is c

383. An ARP request is \_\_\_\_\_ to \_\_\_\_\_.

- a. Multicast; one host
- b. Unicast; all hosts
- c. Broadcast; all hosts
- d. Unicast; one host

The correct **answer** is c

384. What is the maximum size of the data portion of the IP datagram?

- a. 65,515 bytes
- b. 65,535 bytes
- c. 65,475 bytes
- d. 65,460 bytes

The correct **answer** is a

385. A best-effort delivery service such as IP does not include \_\_\_\_\_.

- a. Error correction
- b. Error checking
- c. Datagram acknowledgment
- d. All the above

The correct **answer** is d

386. An HLEN value of decimal 10 means \_\_\_\_\_.

- a. There is 10 bytes of options
- b. There is 40 bytes in the header
- c. There is 40 bytes of options
- d. There is 10 bytes in the header

The correct **answer** is b

387. In IPv4, what is the value of the total length field in bytes if the header is 28 bytes and the data field is 400 bytes?

- a. 407
- b. 107
- c. 428
- d. 427

The correct **answer** is c

388. If the fragment offset has a value of 100, it means that \_\_\_\_\_.

- a. The first byte of the datagram is byte 800
- b. The datagram has not been fragmented
- c. The datagram is 100 bytes in size
- d. The first byte of the datagram is byte 100

The correct **answer** is a

389. What is needed to determine the number of the last byte of a fragment?

- a. Identification number
- b. Offset number
- c. Total length
- d. (b) and (c)

The correct **answer** is d

390. The IP header size \_\_\_\_\_.

- a. Depends on the MTU
- b. Is 20 to 60 bytes long
- c. Is 20 bytes long
- d. Is 60 bytes long

The correct **answer** is b

391. If a host needs to synchronize its clock with another host, it sends a \_\_\_\_\_ message.

- a. Time-exceeded
- b. Time-stamp-request
- c. Source-quench
- d. Router-advertisement

The correct **answer** is b

392. Which of the following is a necessary part of the IPv6 datagram?

- a. Base header
- b. Extension header
- c. Data packet from the upper layer
- d. (a) and (c)

The correct **answer** is d

393. \_\_\_\_\_ is a dynamic mapping protocol in which a physical address is found for a given IP address.

- a. RARP
- b. ICMP
- c. ARP
- d. None of the above

The correct **answer** is c

394. A router reads the \_\_\_\_\_ address on a packet to determine the next hop.

- a. MAC
- b. Source
- c. IP
- d. ARP

The correct **answer** is c

395. The target hardware address on an Ethernet is \_\_\_\_\_ in an ARP request.

- a. Variable
- b. Class-dependent
- c. 0x000000000000
- d. 0.0.0.0

The correct **answer** is c

396. When not all fragments of a message have been received within the designated amount of time, a \_\_\_\_\_ error message is sent.

- a. Time-exceeded
- b. Parameter-problem
- c. Source-quench
- d. Time-stamp-request

The correct **answer** is a

397. A \_\_\_\_\_ can learn about network \_\_\_\_\_ by sending out a router-solicitation packet.

- a. Router; routers
- b. Router; hosts
- c. Host; routers
- d. Host; hosts

The correct **answer** is c

398. Which of the following types of ICMP messages needs to be encapsulated into an IP datagram?

- a. Time-exceeded
- b. Multicasting
- c. Echo reply
- d. All the above

The correct **answer** is d

399. The purpose of echo request and echo reply is to \_\_\_\_\_.

- a. Report errors
- b. Check packet lifetime
- c. Check node-to-node communication
- d. Find IP addresses

The correct **answer** is c

400. An ARP reply is \_\_\_\_\_ to \_\_\_\_\_.

- a. Unicast; one host
- b. Broadcast; all hosts
- c. Multicast; one host
- d. Unicast; all hosts

The correct **answer** is a

401. One method to alert a source host of congestion is the \_\_\_\_\_ message.

- a. Source-quench
- b. Redirection
- c. Echo-request
- d. Destination-unreachable

The correct **answer** is a

402. A time-exceeded message is generated if \_\_\_\_\_.

- a. The round-trip time between hosts is close to zero
- b. The time-to-live field has a zero value
- c. Fragments of a message do not arrive within a set time
- d. (b) and (c)

The correct **answer** is d

403. To determine whether a node is reachable, \_\_\_\_\_ message can be sent.

- a. An echo-request
- b. An echo-reply
- c. A redirection
- d. A source-quench

The correct **answer** is a

404. In IPv6, the \_\_\_\_\_ field in the base header restricts the lifetime of a datagram.

- a. Version
- b. Hop limit
- c. Priority
- d. Next-header

The correct **answer** is b

405. In IPv4, what is the length of the data field given an HLEN value of 12 and total length value of 40,000?

- a. 39,952
- b. 39,988
- c. 40,012
- d. 40,048

The correct **answer** is a

406. A datagram is fragmented into three smaller datagrams. Which of the following is true?

- a. The do not fragment bit is set to 1 for all three datagrams.
- b. The identification field is the same for all three datagrams.
- c. The more fragment bit is set to 0 for all three datagrams.
- d. The offset field is the same for all three datagrams.

The correct **answer** is b

407. Errors in the header or option fields of an IP datagram require a \_\_\_\_\_ error message.

- a. Source-quench
- b. Parameter-problem
- c. Router-solicitation
- d. Redirection

The correct **answer** is b

408. The cost field of a router's first table from itself always has a value of \_\_\_\_\_.

- a. Some positive integer
- b. 0
- c. 1

d. Infinity

The correct **answer** is b

409. A routing table contains \_\_\_\_\_.

- a. The destination network ID
- b. The hop count to reach the network
- c. The router ID of the next hop
- d. All the above

The correct **answer** is d

410. Router B receives an update from router A that indicates Net1 is two hops away. The next update from A says Net1 is five hops away. What value is entered in B's routing table for Net1? Assume the basic RIP is being used.

- a. 6
- b. 7
- c. 2
- d. 3

The correct **answer** is a

411. If the routing table contains four new entries, how many update messages must the router send to its one neighbor router?

- a. 3
- b. 4
- c. 1
- d. 2

The correct **answer** is c

412. An area border router can be connected to \_\_\_\_\_.

- a. Only another router
- b. Only another network
- c. Only another area border router
- d. Another router or another network

The correct **answer** is d

413. Which of the following usually has the least number of connections to other areas?

- a. A transient link
- b. A stub link
- c. An area
- d. An autonomous system

The correct **answer** is b

414. \_\_\_\_\_ is used in a dense multicast environment while \_\_\_\_\_ is used in a sparse multicast environment.

- a. PIM-SM; PIM-DM
- b. PIM; PIM-DM
- c. PIM; PIM-SM
- d. PIM-DM; PIM-SM

The correct **answer** is d

415. When a multicast router is not directly connected to another multicast router, a \_\_\_\_\_ can be formed to connect the two.

- a. Logical core
- b. Spanning tree
- c. Physical tunnel
- d. Logical tunnel

The correct **answer** is d

416. Which type of network using the OSPF protocol can have five routers attached to it?

- a. Transient
- b. Stub
- c. Point-to-point
- d. All the above

The correct **answer** is a

417. A WAN using the OSPF protocol that connects two routers is an example of a \_\_\_\_\_ type of OSPF network.

- a. Stub

- b. Point-to-point
- c. Transient
- d. Virtual

The correct **answer** is b

418. If four hosts on a network belong to the same group, a total of \_\_\_\_\_ sent in

- a. One membership report is
- b. Two membership reports are
- c. Three membership reports are
- d. Four membership reports are

The correct **answer** is b

419. A one-to-all communication between a source and all hosts on a network is classified as a \_\_\_\_\_ communication.

- a. Unicast
- b. Multicast
- c. Broadcast
- d. (a) and (b)

The correct **answer** is c

420. Which type of BGP message announces a route to a new destination?

- a. Update
- b. Open
- c. Keep-alive
- d. Notification

The correct **answer** is a

421. Which layer produces the OSPF message?

- a. Data link
- b. Transport
- c. Application
- d. Network

The correct **answer** is d

422. Which of the following is an exterior routing protocol?

- a. RIP
- b. OSPF
- c. BGP
- d. (a) and (b)

The correct **answer** is c

423. An area is \_\_\_\_\_.

- a. Composed of at least two ASs
- b. Another term for an internet
- c. Part of an AS
- d. A collection of stub areas

The correct **answer** is c

424. In an autonomous system with n areas, how many areas are connected to the backbone?

- a. 1
- b. n
- c. n - 1
- d. n + 1

The correct **answer** is c

425. Which of the following is an interior routing protocol?

- a. RIP
- b. OSPF
- c. BGP
- d. (a) and (b)

The correct **answer** is d

426. OSPF is based on \_\_\_\_\_.

- a. Distance vector routing
- b. Path vector routing
- c. Link state routing
- d. (a) and (b)

The correct **answer** is c

427. BGP is based on \_\_\_\_\_.

- a. Distance vector routing
- b. Link state routing
- c. Path vector routing
- d. (a) and (b)

The correct **answer** is c

428. Which type of BGP message creates a relationship between two routers?

- a. Keep-alive
- b. Open
- c. Update
- d. Notification

The correct **answer** is b

429. Which type of network using the OSPF protocol always consists of just two connected routers?

- a. Transient
- b. Stub
- c. Point-to-point
- d. Virtual

The correct **answer** is c

430. Which type of network using the OSPF protocol is the result of a break in a link between two routers?

- a. Virtual
- b. Point-to-point
- c. Transient
- d. Stub

The correct **answer** is a

431. Which type of BGP message is sent by a router to close a connection?

- a. Open
- b. Update
- c. Notification
- d. Keep-alive

The correct **answer** is c

432. An IGMP query is sent from a \_\_\_\_\_ to a \_\_\_\_\_.

- a. Router; host or router
- b. Host; host
- c. Host; router
- d. Router; router

The correct **answer** is a

433. Which type of BGP message is sent by a system to notify another router of the sender's existence?

- a. Keep-alive
- b. Notification
- c. Open
- d. Update

The correct **answer** is a

434. An Ethernet LAN using the OSPF protocol with five attached routers can be called a \_\_\_\_\_ network.

- a. Point-to-point
- b. Stub
- c. Transient
- d. Virtual

The correct **answer** is c

435. In distance vector routing each router receives information directly from \_\_\_\_\_.

- a. Its neighbors only
- b. Every router on the network
- c. Every router less than two units away
- d. A table stored by the network hosts

The correct **answer** is a

436. A system uses group-shared trees for multicasting. If there are 100 sources and 5 groups, there is a maximum of \_\_\_\_\_ different trees.

- a. 20
- b. 100
- c. 5
- d. 500

The correct **answer** is c

437. \_\_\_\_\_ is a multicast routing protocol using source-based trees.

- a. DVRMP
- b. MOSPF
- c. CBT
- d. (a) and (b)

The correct **answer** is d

438. Pruning and grafting are strategies used in \_\_\_\_\_.

- a. RPM
- b. RPF
- c. RPB
- d. All the above

The correct **answer** is a

439. In distance vector routing a router sends out information \_\_\_\_\_.

- a. Only when there is a change in its table
- b. Only when a new host is added
- c. At regularly scheduled intervals
- d. Only when a new network is added

The correct **answer** is c

440. The \_\_\_\_\_ field of the IGMP message is all zeros in a query message.

- a. Version
- b. Type
- c. Group address
- d. Checksum

The correct **answer** is c

441. The \_\_\_\_\_ field of the IGMP message is 0x11 for a query message.

- a. Version
- b. Type
- c. Checksum
- d. d. (a) and (b)

The correct **answer** is d

442. A one-to-many communication between a source and a specific group of hosts is classified as a \_\_\_\_\_ communication.

- a. Multicast
- b. Unicast
- c. Broadcast
- d. (a) and (b)

The correct **answer** is a

443. A one-to-one communication between a source and one destination is classified as a \_\_\_\_\_ communication.

- a. Unicast
- b. Multicast
- c. Broadcast
- d. d. (a) and (b)

The correct **answer** is a

444. \_\_\_\_\_ is a multicasting application.

- a. Teleconferencing
- b. Distance learning
- c. Information dissemination
- d. All the above

The correct **answer** is d

445. A \_\_\_\_\_ is a data structure with nodes and edges and a hierarchical structure.

- a. Graph
- b. Leaf
- c. Tree
- d. Root

The correct **answer** is c

446. A system uses source-based trees for multicasting. If there are 100 sources and 5 groups, there is a maximum of \_\_\_\_\_ different trees.

- a. 5
- b. 20
- c. 100
- d. 500

The correct **answer** is d

447. In a \_\_\_\_\_ tree approach to multicasting, the combination of source and group determines the tree.

- a. Shortest-group
- b. Source-based
- c. Spanning-source
- d. Group-shared

The correct **answer** is b

448. In a \_\_\_\_\_ tree approach to multicasting, the group determines the tree.

- a. Group-shared
- b. Spanning-source
- c. Shortest-group
- d. Source-based

The correct **answer** is a

449. \_\_\_\_\_ is a multicast routing protocol using group-shared trees.

- a. DVRMP
- b. MOSPF
- c. CBT
- d. (a) and (b)

The correct **answer** is c

450. In \_\_\_\_\_ a network can receive a multicast packet from a particular source only through a designated parent router.

- a. RPF
- b. RPM
- c. RPB
- d. All the above

The correct **answer** is c

451. Dijkstra's algorithm is used to \_\_\_\_\_.

- a. Create LSAs
- b. Flood an internet with information
- c. Create a link state database
- d. Calculate the routing tables

The correct **answer** is d

452. A \_\_\_\_\_ message tells an upstream router to stop sending multicast messages for a specific group through a specific router.

- a. Graft

- b. Prune
- c. Weed
- d. Plum

The correct **answer** is b

453. The \_\_\_\_\_ is used by a router in response to a received-leave report.

- a. Special query message
- b. General query message
- c. Membership report
- d. Leave report

The correct **answer** is a

454. RIP is based on \_\_\_\_\_.

- a. Link state routing
- b. Dijkstra's algorithm
- c. Path vector routing
- d. Distance vector routing

The correct **answer** is d

455. A \_\_\_\_\_ message tells an upstream router to start sending multicast messages for a specific group through a specific router.

- a. Weed
- b. Prune
- c. Plum
- d. Graft

The correct **answer** is d

456. \_\_\_\_\_ uses multicast link state routing concepts to create source-based trees.

- a. DVMRP
- b. CBT
- c. BVD
- d. MOSPF

The correct **answer** is d

457. In the \_\_\_\_\_ protocol, a multicast packet is encapsulated inside a unicast packet with the core router as the destination.

- a. DVMRP
- b. CBT
- c. MOSPF
- d. BVD

The correct **answer** is b

458. The \_\_\_\_\_ is an IGMP message.

- a. Query message
- b. Membership report
- c. Leave report
- d. All the above

The correct **answer** is d

459. The \_\_\_\_\_ defines the client program.

- a. Well-known port number
- b. Ephemeral port number
- c. IP address
- d. Physical address

The correct **answer** is b

460. The \_\_\_\_\_ timer is used in the termination phase.

- a. Retransmission
- b. Time-waited
- c. Persistence
- d. Keep-alive

The correct **answer** is b

461. Which is a legal port address?

- a. 0
- b. 513
- c. 65,535
- d. All the above

The correct **answer** is d

462. The definition of reliable delivery includes \_\_\_\_\_.

- a. Error-free delivery
- b. Receipt of the complete message
- c. In-order delivery
- d. All the above

The correct **answer** is d

463. Which of the following does UDP guarantee?

- a. Acknowledgments to the sender
- b. Flow control
- c. Sequence numbers on each user datagram
- d. None of the above

The correct **answer** is d

464. The source port address on the UDP user datagram header defines \_\_\_\_\_.

- a. The sending computer
- b. The receiving computer
- c. The application program on the receiving computer
- d. The application program on the sending computer

The correct **answer** is d

465. A host can be identified by \_\_\_\_\_ while a program running on the host can be identified by \_\_\_\_\_.

- a. A port number; an IP address
- b. An IP address; a port number
- c. An IP address; a host address
- d. An IP address; a well-known port

The correct **answer** is b

466. Which of the following is not part of the UDP user datagram header?

- a. Source port address
- b. Checksum
- c. Length of header
- d. Destination port address

The correct **answer** is c

467. The \_\_\_\_\_ defines the server program.

- a. IP address
- b. Well-known port number
- c. Ephemeral port number
- d. Physical address

The correct **answer** is b

468. IP is responsible for \_\_\_\_\_ communication while TCP is responsible for \_\_\_\_\_ communication.

- a. Process-to-process; node-to-node
- b. Host-to-host; process-to-process
- c. Process-to-process; host-to-host
- d. Node-to-node; process-to-process

The correct **answer** is b

469. The \_\_\_\_\_ timer is needed to handle the zero window-size advertisement.

- a. Persistence
- b. Keep-alive
- c. Retransmission
- d. Time-waited

The correct **answer** is a

470. Connection establishment involves a \_\_\_\_\_ handshake.

- a. Three-way
- b. One-way
- c. Two-way
- d. None of the above

The correct **answer** is a

471. A special segment called a probe is sent by a sending TCP when the \_\_\_\_\_ timer goes off.

- a. Persistence
- b. Transmission
- c. Keep-alive
- d. Time-waited

The correct **answer** is a

472. The \_\_\_\_\_ address uniquely identifies a running application program.

- a. IP address
- b. NIC
- c. Socket
- d. Host

The correct **answer** is c

473. The \_\_\_\_\_ field is used to order packets of a message.

- a. Sequence number
- b. Acknowledgment number
- c. Urgent pointer
- d. Checksum

The correct **answer** is a

474. The \_\_\_\_\_ field is used for error detection.

- a. Sequence number
- b. Acknowledgment number
- c. Urgent pointer
- d. Checksum

The correct **answer** is d

475. Multiply the header length field by \_\_\_\_\_ to find the total number of bytes in the TCP header.

- a. 4
- b. 6
- c. 8
- d. 2

The correct **answer** is a

476. Urgent data require the urgent pointer field as well as the URG bit in the \_\_\_\_\_ field.

- a. Sequence number
- b. Control
- c. Offset
- d. Reserved

The correct **answer** is b

477. In \_\_\_\_\_, data are sent or processed at a very inefficient rate, such as 1 byte at a time.

- a. Silly window syndrome
- b. Sliding window syndrome
- c. Nagle's syndrome
- d. Delayed acknowledgment

The correct **answer** is a

478. The \_\_\_\_\_ timer keeps track of the time between the sending of a segment and the receipt of an acknowledgment.

- a. Time-waited
- b. Retransmission
- c. Persistence
- d. Keep-alive

The correct **answer** is b

479. To prevent silly window syndrome created by a receiver that processes data at a very slow rate, \_\_\_\_\_ can be used.

- a. Clark's solution
- b. Nagle's algorithm
- c. Delayed acknowledgment
- d. (a) or (c)

The correct **answer** is d

480. To prevent silly window syndrome created by a sender that sends data at a very slow rate, \_\_\_\_\_ can be used.

- a. Nagle's algorithm
- b. Clark's solution
- c. Delayed acknowledgment
- d. (a) or (c)

The correct **answer** is a

481. An ACK number of 1000 always means that \_\_\_\_\_.

- a. 999 bytes has been successfully received
- b. 1000 bytes has been successfully received
- c. 1001 bytes has been successfully received
- d. None of the above

The correct **answer** is d

482. The \_\_\_\_\_ timer prevents a long idle connection between two TCPs.

- a. Keep-alive
- b. Time-waited
- c. Retransmission
- d. Persistence

The correct **answer** is a

483. UDP and TCP are both \_\_\_\_\_ layer protocols.

- a. Physical
- b. Data link
- c. Network
- d. Transport

The correct **answer** is d

484. Which of the following functions does UDP perform?

- a. End-to-end reliable data delivery
- b. Process-to-process communication
- c. Host-to-host communication
- d. All the above

The correct **answer** is b

485. UDP needs the \_\_\_\_\_ address to deliver the user datagram to the correct application program.

- a. Application
- b. Internet
- c. Physical
- d. Port

The correct **answer** is d

486. Karn's algorithm is used in calculations by the \_\_\_\_\_ timer.

- a. a. Time-waited
- b. Retransmission
- c. Persistence
- d. Keep-alive

The correct **answer** is b

487. Slow start is used in conjunction with \_\_\_\_\_ as a TCP congestion control strategy.

- a. Multiplicative increase
- b. Multiplicative decrease

- c. Additive increase
- d. Additive decrease

The correct **answer** is c

488. The maximum length of time that traffic is generated at the peak rate is called the \_\_\_\_\_.

- a. Effective bandwidth
- b. Average data rate
- c. Maximum burst size
- d. Constant bit rate

The correct **answer** is c

489. For a system using TCP, the sender window size is determined by the \_\_\_\_\_ window size.

- a. Receiver
- b. Sender
- c. Congestion
- d. (a) and (c)

The correct **answer** is d

490. \_\_\_\_\_ traffic features sudden data rate changes in very short periods of time.

- a. Constant-bit-rate
- b. Bursty
- c. Variable-bit-rate
- d. Peak-bit-rate

The correct **answer** is b

491. When the load is greater than the capacity, the delay \_\_\_\_\_.

- a. Decreases
- b. Goes to infinity
- c. Increases linearly
- d. Goes to zero

The correct **answer** is b

492. \_\_\_\_\_ is a closed-loop mechanism to alleviate congestion.

- a. A choke point
- b. Implicit signaling
- c. Explicit signaling
- d. All the above

The correct **answer** is d

493. The FECN informs the \_\_\_\_\_ of congestion while the BECN informs the \_\_\_\_\_ of congestion.

- a. Sender; destination
- b. Interface; sender
- c. Destination; interface
- d. Destination; sender

The correct **answer** is d

494. The \_\_\_\_\_ is the maximum data rate of the traffic.

- a. Average data rate
- b. Maximum burst size
- c. Effective bandwidth
- d. Peak data rate

The correct **answer** is d

495. \_\_\_\_\_ is a flow characteristic in which the delay varies for packets belonging to the same flow.

- a. Choke point
- b. Additive increase
- c. Jitter
- d. Throughput

The correct **answer** is b

496. In \_\_\_\_\_ queuing the first packet into the queue is the first packet out of the queue.

- a. Priority

- b. Weighted fair
- c. FIFO
- d. LIFO

The correct **answer** is c

497. In Frame Relay the transmission rate can never exceed \_\_\_\_\_.

- a. Bc
- b. The access rate
- c. Be
- d. CIR

The correct **answer** is b

498. \_\_\_\_\_ measures the variation in cell transmission time.

- a. SCR
- b. CVDT
- c. PCR
- d. MCR

The correct **answer** is b

499. If the SCR is 60,000, the PCR is 70,000, and the MCR is 55,000, what is the minimum number of cells that can be sent per second?

- a. 60,000
- b. 70,000
- c. 55,000
- d. 5000

The correct **answer** is c

500. The \_\_\_\_\_ traffic shaping method gives a host credit for its idle time.

- a. Leaky bucket
- b. Traffic bucket
- c. Token bucket
- d. Bursty bucket

The correct **answer** is c

501. A flow-based QoS model designed for IP is called \_\_\_\_\_.

- a. RSVP
- b. Integrated Services
- c. Differentiated Services
- d. Multicast trees

The correct **answer** is b

502. A signaling protocol that helps IP create a flow is called \_\_\_\_\_.

- a. RSVP
- b. Integrated Services
- c. Differentiated Services
- d. Multicast trees

The correct **answer** is a

503. RSVP uses \_\_\_\_\_ messages.

- a. Path
- b. Resv
- c. Resource
- d. (a) and (b)

The correct **answer** is d

504. In an RSVP reservation style called \_\_\_\_\_ filter, the router creates a single reservation that can be shared by a set of flows.

- a. Fixed
- b. Shared explicit
- c. Wild card
- d. All the above

The correct **answer** is b

505. Differentiated Services was designed to handle the \_\_\_\_\_ problem associated with Integrated Services.

- a. Stability
- b. Reservation
- c. Scalability
- d. All the above

The correct **answer** is c

506. A \_\_\_\_\_ is a Differentiated Services traffic conditioner.

- a. Meter
- b. Marker
- c. Shaper

The correct **answer** is c

507. What is the relationship between the access rate and the CIR?

- a. CIR plus Be is equal to the access rate.
- b. CIR is always equal to the access rate.
- c. CIR is greater than the access rate.
- d. CIR is less than the access rate.

The correct **answer** is d

508. If the maximum CTD is 10  $\mu$ s and the minimum CTD is 1  $\mu$ s, the \_\_\_\_\_ is 9  $\mu$ s.

- a. CDV
- b. CLR
- c. CTD
- d. CER

The correct **answer** is a

509. A Frame Relay network is committed to transfer \_\_\_\_\_ bps without discarding any frames.

- a. Be
- b. Bc
- c. CIR
- d. (a) and (b)

The correct **answer** is b

510. The effective bandwidth is based on \_\_\_\_\_.

- a. Average data rate
- b. Peak data rate
- c. Maximum burst size
- d. All the above

The correct **answer** is d

511. The cell \_\_\_\_\_ is the difference between the CTD maximum and minimum.

- a. Delay variation
- b. Error ratio
- c. Loss ratio
- d. Transfer delay

The correct **answer** is a

512. The cell \_\_\_\_\_ is the ratio of lost cells to cells sent.

- a. Delay variation
- b. Error ratio
- c. Loss ratio
- d. Transfer delay

The correct **answer** is c

513. The \_\_\_\_\_ service class is particularly suitable for applications with bursty data.

- a. CBR
- b. ABR
- c. VBR
- d. UBR

The correct **answer** is b

514. The \_\_\_\_\_ service class is suitable for customers who need real-time video transmission without compression.

- a. ABR
- b. CBR
- c. VBR
- d. UBR

The correct **answer** is b

515. The \_\_\_\_\_ is greater than the SCR.

- a. MCR
- b. CVDT
- c. PCR
- d. All the above

The correct **answer** is c

516. The \_\_\_\_\_ is the fraction of the cells delivered in error.

- a. CLR
- b. CER
- c. CTD
- d. CDV

The correct **answer** is b

517. When added to Be, Bc should be less than the \_\_\_\_\_.

- a. CIR
- b. Committed burst size
- c. Access rate
- d. (a) and (b)

The correct **answer** is c

518. A connectionless iterative server uses \_\_\_\_\_ ports.

- a. Well-known
- b. Ephemeral
- c. Active
- d. (a) and (b)

The correct **answer** is a

519. The \_\_\_\_\_ socket is used with a protocol that directly uses the services of IP.

- a. Raw
- b. Stream
- c. Datagram
- d. Remote

The correct **answer** is a

520. A \_\_\_\_\_ server serves multiple clients, handling one request at a time.

- a. Connectionless iterative
- b. Connectionless concurrent
- c. Connection-oriented iterative
- d. Connection-oriented concurrent

The correct **answer** is a

521. A client issues \_\_\_\_\_ when it needs service from a server.

- a. An active request
- b. A finite open
- c. An active open
- d. A passive open

The correct **answer** is c

522. A \_\_\_\_\_ server serves multiple clients simultaneously.

- a. Connectionless iterative
- b. Connectionless concurrent
- c. Connection-oriented iterative
- d. Connection-oriented concurrent

The correct **answer** is d

523. The server program is \_\_\_\_\_ because it is always available, waiting for a client request.

- a. Finite
- b. Infinite
- c. Active
- d. Passive

The correct **answer** is b

524. A connection-oriented concurrent server uses \_\_\_\_\_ ports.

- a. Well-known
- b. Ephemeral
- c. Active
- d. (a) and (b)

The correct **answer** is d

525. Machine A requests service X from machine B. Machine B requests service Y from machine A. What is the total number of application programs required?

- a. One
- b. Two
- c. Three
- d. Four

The correct **answer** is d

526. A server program, once it issues \_\_\_\_\_, waits for clients to request its service.

- a. An active request
- b. A finite open
- c. An active open
- d. A passive open

The correct **answer** is d

527. \_\_\_\_\_ can request a service.

- a. A socket interface
- b. A client
- c. A port
- d. A server

The correct **answer** is b

528. \_\_\_\_\_ can provide a service.

- a. An iterative server
- b. A concurrent server
- c. A client
- d. (a) and (b)

The correct **answer** is d

529. The client program is \_\_\_\_\_ because it terminates after it has been served.

- a. Finite
- b. Infinite
- c. Active
- d. Passive

The correct **answer** is a

530. \_\_\_\_\_ processes requests one at a time.

- a. An iterative server
- b. A concurrent client
- c. An iterative client
- d. A concurrent server

The correct **answer** is a

531. The \_\_\_\_\_ socket is used with a connectionless protocol.

- a. Raw
- b. Stream

- c. Datagram
- d. Remote

The correct **answer** is c

532. \_\_\_\_\_ processes many requests simultaneously.

- a. An iterative server
- b. A concurrent client
- c. An iterative client
- d. A concurrent server

The correct **answer** is d

533. In a connection-oriented concurrent server, the \_\_\_\_\_ is used for connection only.

- a. Well-known port
- b. Infinite port
- c. Ephemeral port
- d. (b) and (c)

The correct **answer** is a

534. A \_\_\_\_\_ is an instance of a \_\_\_\_\_.

- a. Program; process
- b. Process; program
- c. Process; service
- d. Structure; process

The correct **answer** is b

535. The \_\_\_\_\_ socket is used with a connection-oriented protocol.

- a. Raw
- b. Stream
- c. Datagram
- d. Remote

The correct **answer** is b

536. In the string 219.46.123.107.in-addr.arpa, what is the network address of the host we are looking for?

- a. 107.123.46.0
- b. 107.0.0.0
- c. 219.46.123.0
- d. 107.123.0.0

The correct **answer** is b

537. In \_\_\_\_\_ resolution the client is in direct contact with at most one server.

- a. A cache
- b. A recursive
- c. An iterative
- d. All the above

The correct **answer** is b

538. In address-to-name resolution the \_\_\_\_\_ domain is used.

- a. Reverse
- b. Generic
- c. Country
- d. Inverse

The correct **answer** is d

539. How is the lifetime of a name-to-address resolution in cache memory controlled?

- a. By the time-to-live field set by the server
- b. By the time-to-live counter set by the server
- c. By the time-to-live field set by the authoritative server
- d. (b) and (c)

The correct **answer** is d

540. A DNS response is classified as \_\_\_\_\_ if the information comes from a cache memory.

- a. Authoritative

- b. Recursive
- c. Unauthoritative
- d. Iterative

The correct **answer** is c

541. A host with the domain name pit.arc.nasa.gov. is on the \_\_\_\_\_ level of the DNS hierarchical tree. (The root is level 1.)

- a. Fourth
- b. Fifth
- c. Third
- d. Not enough information given

The correct **answer** is b

542. A DNS \_\_\_\_\_ server's zone is the entire DNS tree.

- a. Secondary
- b. Root
- c. Primary
- d. All the above

The correct **answer** is b

543. To find the IP address of a host when the domain name is known, the \_\_\_\_\_ can be used.

- a. Inverse domain
- b. Generic domains
- c. Country domains
- d. (b) or (c)

The correct **answer** is a

544. A DNS \_\_\_\_\_ server gets its data from another DNS server.

- a. Root
- b. Primary
- c. Secondary
- d. All the above

The correct **answer** is c

545. A DNS \_\_\_\_\_ server creates, maintains, and updates the zone file.

- a. Root
- b. Primary
- c. Secondary
- d. All the above

The correct **answer** is b

546. A host with the domain name trinity.blue.vers.inc is on the \_\_\_\_\_ level of the DNS hierarchical tree. (The root is level 1.)

- a. Fourth
- b. Fifth
- c. Third
- d. Not enough information given

The correct **answer** is d

547. In the domain name chal.atc.fhda.edu, \_\_\_\_\_ is the least specific label.

- a. fhda
- b. edu
- c. chal
- d. atc

The correct **answer** is b

548. In the domain name chal.atc.fhda.edu, \_\_\_\_\_ is the most specific label.

- a. Fhda
- b. chal
- c. atc
- d. edu

The correct **answer** is b

549. In \_\_\_\_\_ resolution the client could directly contact more than one server.

- a. An iterative
- b. A cache
- c. A recursive
- d. All the above

The correct **answer** is a

550. Which of the following domain names would most likely use a country domain to resolve its IP address?

- a. chal.atac.fhda.edu
- b. kenz.acct.sony.jp
- c. gsfc.nasa.gov
- d. mac.eng.sony.com

The correct **answer** is b

551. A resolver is the \_\_\_\_\_.

- a. Host machine
- b. DNS client
- c. DNS server
- d. Root server

The correct **answer** is b

552. Which of the following is true?

- a. FTP allows systems with different directory structures to transfer files.
- b. FTP allows a system using ASCII and a system using EBCDIC to transfer files.
- c. FTP allows a PC and a SUN workstation to transfer files.
- d. All the above are true.

The correct **answer** is d

553. An email contains a textual birthday greeting, a picture of a cake, and a song. The text must precede the image. What is the content-type?

- a. Multipart/parallel
- b. Multipart/digest
- c. Multipart/alternative
- d. Multipart/mixed

The correct **answer** is d

554. During an FTP session the control connection is opened \_\_\_\_\_.

- a. As many times as necessary
- b. Exactly once
- c. Exactly twice
- d. All the above

The correct **answer** is b

555. The purpose of the MTA is \_\_\_\_\_.

- a. Transferral of messages across the Internet
- b. Message preparation
- c. Envelope creation
- d. (a) and (b)

The correct **answer** is a

556. In anonymous FTP, the user can usually \_\_\_\_\_.

- a. Store files
- b. Retrieve files
- c. Navigate through directories
- d. Do all the above

The correct **answer** is b

557. Which part of the mail created by the UA contains the sender and receiver names?

- a. Header
- b. Body
- c. Envelope
- d. Address

The correct **answer** is a

558. In the email address [mackenzie@pit.arc.nasa.gov](mailto:mackenzie@pit.arc.nasa.gov), what is the domain name?

- a. mackenzie
- b. [mackenzie@pit.arc.nasa.gov](mailto:mackenzie@pit.arc.nasa.gov)
- c. pit.arc.nasa.gov
- d. (a) and (b)

The correct **answer** is c

559. The \_\_\_\_\_ field in the MIME header uses text to describe the data in the body of the message.

- a. Content-transfer-encoding
- b. Content-Id
- c. Content-type
- d. Content-description

The correct **answer** is b

560. The \_\_\_\_\_ field in the MIME header describes the method used to encode the data.

- a. Content-Id
- b. Content-description
- c. Content-type
- d. Content-transfer-encoding

The correct **answer** is d

561. The \_\_\_\_\_ field in the MIME header has type and subtype subfields.

- a. Content-transfer-encoding
- b. Content-type
- c. Content-Id
- d. Content-description

The correct **answer** is b

562. A JPEG image is sent as email. What is the content-type?

- a. Multipart/mixed
- b. Multipart/image
- c. Image/basic
- d. Image/JPEG

The correct **answer** is d

563. The purpose of the UA is \_\_\_\_\_.

- a. Message preparation
- b. Envelope creation
- c. Transferral of messages across the Internet
- d. (a) and (b)

The correct **answer** is d

564. The \_\_\_\_\_ field in the MIME header is the type of data and the body of the message.

- a. Content-Id
- b. Content-description
- c. Content-type
- d. Content-transfer-encoding

The correct **answer** is c

565. A message is fragmented into three email messages. What is the content-type?

- a. Message/partial
- b. Multipart/partial
- c. Multipart/mixed
- d. Message/RFC822

The correct **answer** is a

566. A client machine usually needs \_\_\_\_\_ to send email.

- a. Only POP
- b. Both SMTP and POP
- c. Only SMTP
- d. None of the above

The correct **answer** is c

567. In FTP, what attributes must be defined by the client prior to transmission?

- a. Data type
- b. File structure
- c. Transmission mode
- d. All the above

The correct **answer** is d

568. In FTP, there are three types of \_\_\_\_\_: stream, block, and compressed.

- a. Data structures
- b. Transmission modes
- c. Files
- d. All the above

The correct **answer** is b

569. In FTP, ASCII, EBCDIC, and image define an attribute called \_\_\_\_\_.

- a. Data structure
- b. Transmission mode
- c. File type
- d. All the above

The correct **answer** is c

570. In FTP, when you \_\_\_\_\_, it is copied from the server to the client.

- a. Retrieve a file
- b. Store a file
- c. Retrieve a list
- d. (a) and (c)

The correct **answer** is d

571. In FTP, when you \_\_\_\_\_, it is copied from the client to the server.

- a. Retrieve a file
- b. Store a file
- c. Retrieve a list
- d. (a) and (c)

The correct **answer** is b

572. An email contains a textual birthday greeting, a picture of a cake, and a song. The order is not important. What is the content-type?

- a. Multipart/digest
- b. Multipart/alternative
- c. Multipart/mixed
- d. Multipart/parallel

The correct **answer** is d

573. During an FTP session the data connection is opened \_\_\_\_\_.

- a. Exactly once
- b. Exactly twice
- c. As many times as necessary
- d. All the above

The correct **answer** is c

574. Which of the following is a retrieval method?

- a. HTTP
- b. FTP
- c. TELNET
- d. All the above

The correct **answer** is d

575. A request message always contains \_\_\_\_\_.

- a. A status line, a header, and a body
- b. A status line and a header
- c. A header and a body

d. A request line and a header

The correct **answer** is d

576. Which of the following is present in both a request line and a status line?

- a. URL
- b. Status code
- c. HTTP version number
- d. Status phrase

The correct **answer** is c

577. Which of the following is not a client program in WWW?

- a. FTP
- b. HTTP
- c. HTML
- d. TELNET

The correct **answer** is c

578. A user wants to replace a document with a newer version; the request line contains the \_\_\_\_\_ method.

- a. PUT
- b. GET
- c. POST
- d. COPY

The correct **answer** is a

579. The \_\_\_\_\_ header can specify the client configuration and the client's preferred document format.

- a. Request
- b. Response
- c. General
- d. Entity

The correct **answer** is a

580. The \_\_\_\_\_ tags enclose binary code or byte code.

- a. Executable contents
- b. Image
- c. List
- d. Hyperlink

The correct **answer** is a

581. Which type of Web document is run at the client site?

- a. Dynamic
- b. Active
- c. Static
- d. All the above

The correct **answer** is b

582. HTTP has similarities to both \_\_\_\_\_ and \_\_\_\_\_.

- a. FTP; MTV
- b. FTP; URL
- c. FTP; SNMP
- d. FTP; SMTP

The correct **answer** is d

583. A user needs to send the server some information. The request line method is \_\_\_\_\_.

- a. OPTION
- b. POST
- c. PATCH
- d. MOVE

The correct **answer** is b

584. A response message always contains \_\_\_\_\_.

- a. A header and a body
- b. A status line, a header, and a body

- c. A request line and a header
- d. A status line and a header

The correct **answer** is c

585. The \_\_\_\_\_ header supplies information about the body of a document.

- a. General
- b. Request
- c. Entity
- d. Response

The correct **answer** is c

586. The \_\_\_\_\_ header can specify the server configuration or provide information about a request.

- a. General
- b. Request
- c. Response
- d. Entity

The correct **answer** is c

587. Hypertext documents are linked through \_\_\_\_\_.

- a. TELNET
- b. Pointers
- c. DNS
- d. Homepages

The correct **answer** is b

588. Which of the following is an interpreter?

- a. CGI
- b. FTP
- c. HTTP
- d. HTML

The correct **answer** is d

589. What are the components of a browser?

- a. Controller, client program, interpreter
- b. Retrieval method, host computer, path name
- c. Hypertext, hypermedia, HTML
- d. All the above

The correct **answer** is a

590. A user needs to retrieve a document from the server; the request line contains the \_\_\_\_\_ method.

- a. GET
- b. HEAD
- c. POST
- d. PUT

The correct **answer** is a

591. Which type of Web document is fixed-content and is created and stored at the server site?

- a. Dynamic
- b. Active
- c. Static
- d. All the above

The correct **answer** is c

592. The \_\_\_\_\_ of a Web page contains the title and parameters used by the browser.

- a. Attributes
- b. Tags
- c. Head
- d. Body

The correct **answer** is c

593. Which type of Web document is created at the server site only when requested by a client?

- a. Active

- b. Static
- c. Dynamic
- d. All the above

The correct **answer** is c

594. In  ALIGN is \_\_\_\_\_.

- a. The head
- b. The body
- c. A tag
- d. An attribute

The correct **answer** is d

595. A user wants to copy a file to another location; the request line contains the \_\_\_\_\_ method.

- a. PUT
- b. PATCH
- c. COPY
- d. POST

The correct **answer** is c

596. What does the URL need to access a document?

- a. Path name
- b. Host computer
- c. Retrieval method
- d. All the above

The correct **answer** is d

597. Which type of Web document is transported from the server to the client in binary form?

- a. Active
- b. Static
- c. Dynamic
- d. All the above

The correct **answer** is a

598. An ending tag is usually of the form \_\_\_\_\_

- a. <tagname>
- b. <tagname!>
- c. </tagname>

The correct **answer** is c

599. An applet is a small application program written in \_\_\_\_\_

- a. Shell script
- b. Java
- c. C
- d. C++

The correct **answer** is b

600. Stock quotations are posted on the Web. This is probably a(n) \_\_\_\_\_ document.

- a. Passive
- b. Dynamic
- c. Active
- d. Static

The correct **answer** is b

601. Updates for a satellite's coordinates can be obtained on the WWW. This is probably a(n) \_\_\_\_\_ document.

- a. Passive
- b. Dynamic
- c. Active
- d. Static

The correct **answer** is b

602. A user needs to move a file to another location. The request line method is \_\_\_\_\_.

- a. PATCH

- b. MOVE
- c. PUT
- d. GET

The correct **answer** is b

603. Which category of HTML tags allows the listing of documents?

- a. Image
- b. Hyperlink
- c. List
- d. Executable contents

The correct **answer** is c

604. A program can use \_\_\_\_\_ to write a CGI program.

- a. Bourne shell script
- b. Perl
- c. C
- d. Any of the above

The correct **answer** is d

605. An unemployed actor has posted his resume on the Web. This is probably a(n) \_\_\_\_\_ document.

- a. Passive
- b. Dynamic
- c. Active
- d. Static

The correct **answer** is d

606. The server receives input from a browser through \_\_\_\_\_.

- a. An attribute
- b. A form
- c. A tag
- d. Any of the above

The correct **answer** is b

607. Output from a CGI program is \_\_\_\_\_.

- a. Text
- b. Graphics
- c. Binary data
- d. Any of the above

The correct **answer** is d

608. \_\_\_\_\_ is used to enable the use of active documents.

- a. CGI
- b. Java
- c. HTML
- d. All the above

The correct **answer** is c

609. Java is \_\_\_\_\_.

- a. A programming language
- b. A run-time environment
- c. A class library
- d. All the above

The correct **answer** is d

610. An applet is \_\_\_\_\_ document application program.

- a. An active
- b. A passive
- c. A static
- d. A dynamic

The correct **answer** is a

611. In a real-time video conference, data from the server are \_\_\_\_\_ to the client sites.

- a. Unicast
- b. Broadcast
- c. Multicast
- d. None of the above

The correct **answer** is c

612. A \_\_\_\_\_ adds signals from different sources to create a single signal.

- a. Mixer
- b. Translator
- c. Timestamp
- d. Sequence number

The correct **answer** is a

613. The RTCP \_\_\_\_\_ message shuts down a stream.

- a. Application-specific
- b. Source description
- c. Bye
- d. Farewell

The correct **answer** is c

614. A standard that allows a telephone (connected to a public telephone network) to talk to a computer connected to the Internet is \_\_\_\_\_.

- a. SIP
- b. H.323
- c. IEEE 802.3
- d. V.90bis

The correct **answer** is b

615. A \_\_\_\_\_ changes the format of a high-bandwidth video signal to a lower-quality narrow-bandwidth signal.

- a. Timestamp
- b. Sequence number
- c. Mixer
- d. Translator

The correct **answer** is d

616. An RTP packet is encapsulated in a(n) \_\_\_\_\_.

- a. IP datagram
- b. RTCP packet
- c. UDP user datagram
- d. TCP segment

The correct **answer** is c

617. The last step in JPEG, \_\_\_\_\_, removes redundancies.

- a. Blocking
- b. Compression
- c. Quantization
- d. Vectorization

The correct **answer** is b

618. A \_\_\_\_\_ shows when a packet was produced relative to the first or previous packet.

- a. Sequence number
- b. Threshold
- c. Timestamp
- d. Playback buffer

The correct **answer** is c

619. \_\_\_\_\_ is a protocol to set up and terminate a connection between a computer on the Internet and a telephone (connected to a public telephone network).

- a. H.245
- b. H.225
- c. H.323
- d. Q.931

The correct **answer** is d

620. TCP is not suitable for real-time traffic because \_\_\_\_\_.

- a. There is no provision for timestamping
- b. There is no support for multicasting
- c. Missing packets are retransmitted
- d. All the above

The correct **answer** is d

621. JPEG encoding involves \_\_\_\_\_, a process that reveals the redundancies in a block.

- a. Quantization
- b. Vectorization
- c. Blocking
- d. The DCT

The correct **answer** is d

622. The RTCP \_\_\_\_\_ report informs the sender and other receivers about the quality of service.

- a. Sender
- b. QoS
- c. Receiver
- d. Passive

The correct **answer** is c

623. \_\_\_\_\_ is an application layer protocol that establishes, maintains, and terminates a multimedia session.

- a. DCT
- b. SIP
- c. RTCP
- d. JPEG

The correct **answer** is b

624. For streaming stored audio/video, the \_\_\_\_\_ holds information about the audio video file.

- a. Jitter
- b. Alpha file
- c. Beta file
- d. Metafile

The correct **answer** is d

625. \_\_\_\_\_ is a control protocol that adds functionalities to the streaming process.

- a. TCP/IP
- b. RTSP
- c. HTTP
- d. SIP

The correct **answer** is b

626. The audio/video stream is sent by the media server to the \_\_\_\_\_.

- a. Media player
- b. Browser
- c. Web server
- d. None of the above

The correct **answer** is a

627. Voice over IP is a(n) \_\_\_\_\_ audio/video application.

- a. Interactive
- b. Streaming stored
- c. Streaming live
- d. None of the above

The correct **answer** is a

628. \_\_\_\_\_ is a SIP message type.

- a. INVITE
- b. CANCEL
- c. OPTIONS

d. All the above

The correct **answer** is d

629. A \_\_\_\_\_ is involved in an SIP mechanism to find the IP address of a callee.

- a. Proxy server
- b. Registrar server
- c. Media server
- d. (a) and (b)

The correct **answer** is d

630. \_\_\_\_\_ are used to number the packets of a real-time transmission.

- a. Translators
- b. Timestamps
- c. Playback buffers
- d. Sequence numbers

The correct **answer** is d

631. In the \_\_\_\_\_ the encryption of each 8-byte block is independent of the others.

- a. CVF
- b. CSM
- c. ECB mode
- d. CBC mode

The correct **answer** is c

632. In the public-key method of cryptography, which key is publicly known?

- a. Encryption key only
- b. Decryption key only
- c. Both
- d. None of the above

The correct **answer** is a

633. A cipher is \_\_\_\_\_.

- a. An encryption algorithm
- b. A decryption algorithm
- c. A private key
- d. (a) or (b)

The correct **answer** is d

634. Before a message is encrypted, it is called \_\_\_\_\_.

- a. Ciphertext
- b. Cryptotext
- c. Cryptonite
- d. Plaintext

The correct **answer** is d

635. If 20 people need to communicate using symmetric-key cryptography, \_\_\_\_\_ symmetric keys are needed.

- a. 190
- b. 200
- c. 19
- d. 20

The correct **answer** is a

636. The \_\_\_\_\_ is an example of polyalphabetic substitution.

- a. P-box
- b. Vigenere cipher
- c. S-box
- d. Product block

The correct **answer** is b

637. In the symmetric-key method of cryptography, which key is publicly known?

- a. Encryption key only
- b. Decryption key only

- c. Both
- d. None of the above

The correct **answer** is d

638. The RSA algorithm uses a \_\_\_\_\_ cryptography method.

- a. Private-key
- b. Symmetric-key
- c. Denominational
- d. Public-key

The correct **answer** is d

639. The \_\_\_\_\_ is a block cipher.

- a. P-box
- b. S-box
- c. Product block
- d. All the above

The correct **answer** is d

640. We use an cryptography method in which the plaintext AAAAAA becomes the ciphertext BCDEFG. This is probably \_\_\_\_\_.

- a. Monoalphabetic substitution
- b. Transposition
- c. Polyalphabetic substitution
- d. None of the above

The correct **answer** is c

641. One way to encrypt and decrypt long messages is through the use of the \_\_\_\_\_.

- a. ECB mode
- b. CBC mode
- c. CFM
- d. All the above

The correct **answer** is d

642. An initialization vector is needed in the \_\_\_\_\_.

- a. CSM
- b. CBC mode
- c. CVF
- d. (a) and (b)

The correct **answer** is d

643. In the public-key method of cryptography, only the receiver has possession of the \_\_\_\_\_.

- a. Public key
- b. Both keys
- c. Private key
- d. None of the above

The correct **answer** is c

644. After a message is decrypted, it is called \_\_\_\_\_.

- a. Ciphertext
- b. Cryptotext
- c. Cryptonite
- d. Plaintext

The correct **answer** is d

645. We use a cryptography method in which the character Z always substitutes for the character G. This is probably \_\_\_\_\_.

- a. Polyalphabetic substitution
- b. Transpositional
- c. Monoalphabetic substitution
- d. None of the above

The correct **answer** is c

646. A protocol called \_\_\_\_\_ describes the certificate issued by a CA in a structural way.

- a. KDC

- b. X.509
- c. CA level 1
- d. Kerberos

The correct **answer** is b

647. Windows 2000 uses an authentication protocol called \_\_\_\_\_.

- a. Otway-Rees
- b. Kerberos
- c. Diffie-Hellman
- d. Needham-Schroeder

The correct **answer** is b

648. In the digital signature technique, the sender of the message uses \_\_\_\_\_ to create ciphertext.

- a. His or her own public key
- b. His or her own private key
- c. His or her own symmetric key
- d. The receiver's private key

The correct **answer** is b

649. A \_\_\_\_\_ is a trusted third party that solves the problem of symmetric-key distribution.

- a. TLS
- b. Firewall
- c. CA
- d. KDC

The correct **answer** is d

650. In a \_\_\_\_\_ attack, a message captured by an intruder is illegally sent a second time.

- a. Return
- b. Replay
- c. Man-in-the-middle
- d. Bucket brigade

The correct **answer** is b

651. In the \_\_\_\_\_ protocol, a nonce is decremented by 1 so that an intruder cannot send the exact same message a second time.

- a. Needham-Schroeder
- b. Diffie-Hellman
- c. Otway-Rees
- d. Kerberos

The correct **answer** is a

652. If user A wants to send an encrypted message to user B, the plaintext is encrypted with the public key of \_\_\_\_\_.

- a. The network
- b. User A
- c. User B
- d. (a) or (b)

The correct **answer** is c

653. When symmetric-key encryption is combined with private-key encryption, the \_\_\_\_\_ key is encrypted with the public key.

- a. Skeleton
- b. Private
- c. Public
- d. Symmetric

The correct **answer** is d

654. The \_\_\_\_\_ issues tickets for the real server.

- a. Real server
- b. Data server
- c. AS
- d. TGS

The correct **answer** is c

655. In \_\_\_\_\_-key cryptography, everyone has access to all the public keys.

- a. Private
- b. Certified
- c. Symmetric
- d. Public

The correct **answer** is c

**656. In the digital signature technique, the receiver of the message uses \_\_\_\_\_ to create plaintext.**

- a. The sender's public key
- b. Her or his own symmetric key
- c. Her or his own private key
- d. Her or his own public key

The correct **answer** is a

**657. A \_\_\_\_\_ is a large number used only once that helps distinguish a fresh authentication request from a repeated one.**

- a. Ticket
- b. Realm
- c. Nonce
- d. Public key

The correct **answer** is c

**658. A \_\_\_\_\_ certifies the binding between a public key and its owner.**

- a. KDC
- b. TLS
- c. CA
- d. Firewall

The correct **answer** is c

**659. In an authentication using symmetric keys, if 10 people need to communicate, we need \_\_\_\_\_ keys.**

- a. 90
- b. 10
- c. 20
- d. 45

The correct **answer** is d

**660. In the \_\_\_\_\_ protocol, the symmetric key is  $K = G^{xy} \text{ mod } N$ , where G and N are public numbers.**

- a. Needham-Schroeder
- b. Otway-Rees
- c. Diffie-Hellman
- d. Kerberos

The correct **answer** is c

**661. In a \_\_\_\_\_ attack, an intruder comes between two communicating parties intercepting and replying to their messages.**

- a. Bucket-in-the-middle
- b. Replay
- c. Return
- d. Man-in-the-middle

The correct **answer** is d

**662. A \_\_\_\_\_ is a trusted third party that establishes a symmetric key between two parties who wish to communicate.**

- a. PKI
- b. TGS
- c. KDC

d. CA

The correct **answer** is c

**663. \_\_\_\_\_ is an authentication protocol that needs an authentication server and a ticket-granting server.**

- a. Needham-Schroeder
- b. Diffie-Hellman
- c. Otway-Rees
- d. Kerberos

The correct **answer** is d

**664. The \_\_\_\_\_ is the KDC in the Kerberos protocol.**

- a. Real server
- b. Data server
- c. AS
- d. TGS

The correct **answer** is c

**665. The \_\_\_\_\_ field in the authentication header and the ESP header define the security method used in creating the authentication data.**

- a. Authentication data
- b. SPI
- c. Padding
- d. Sequence number

The correct **answer** is b

**666. Tunneling is a technique in which the IP datagram is first \_\_\_\_\_ and then \_\_\_\_\_.**

- a. Encapsulated in another datagram; encrypted
- b. Encrypted; encapsulated in another datagram
- c. Authenticated; encrypted
- d. Encrypted; authenticated

The correct **answer** is b

**667. \_\_\_\_\_ is an IP layer security protocol that only provides integrity and authentication.**

- a. PGP
- b. ESP
- c. IPSec
- d. AH

The correct **answer** is d

**668. An \_\_\_\_\_ is a private network with no external access that uses the TCP/IP suite.**

- a. Internet
- b. Intranet
- c. internet
- d. Extranet

The correct **answer** is b

**669. IPSec requires a logical connection between two hosts using a signaling protocol called \_\_\_\_\_.**

- a. PGP
- b. TLS
- c. AH
- d. SA

The correct **answer** is d

**670. An \_\_\_\_\_ is a private network with limited external access that uses the TCP/IP suite.**

- a. Intranet
- b. Extranet

- c. Internet
- d. internet

The correct **answer** is b

**671. The handshake protocol and data exchange protocol are part of \_\_\_\_\_.**

- a. TLS
- b. CA
- c. KDC
- d. SSH

The correct **answer** is a

**672. \_\_\_\_\_ is a collection of protocols that provide security at the IP layer level.**

- a. TLS
- b. SSH
- c. IPSec
- d. PGP

The correct **answer** is c

**673. A method to provide for the secure transport of email is called \_\_\_\_\_.**

- a. TLS
- b. PGP
- c. SA
- d. IPSec

The correct **answer** is b

**674. A VPN uses \_\_\_\_\_ to guarantee privacy.**

- a. IPSec
- b. Tunneling
- c. Both (a) and (b)
- d. None of the above

The correct **answer** is c

**675. A \_\_\_\_\_ can forward or block messages based on the information in the message itself.**

- a. Message digest
- b. Proxy firewall
- c. Packet-filter firewall
- d. Private key

The correct **answer** is b

**676. \_\_\_\_\_ is an IP layer security protocol that provides privacy as well as integrity and authentication.**

- a. AH
- b. PGP
- c. IPSec
- d. ESP

The correct **answer** is d

**677. \_\_\_\_\_ is a transport layer security protocol.**

- a. PGP
- b. IPSec
- c. TLS
- d. AH

The correct **answer** is c

**678. An IP datagram carries an authentication header if the \_\_\_\_\_ field of the IP header has a value of 51.**

- a. Protocol
- b. Security parameter index

- c. Sequence number
- d. Next-header

The correct **answer** is a

**679. A \_\_\_\_\_ network is totally isolated from the global Internet.**

- a. Private
- b. Hybrid
- c. Virtual private
- d. Any of the above

The correct **answer** is a

**680. A \_\_\_\_\_ network can use a leased line for intraorganization communication and the Internet for interorganization communication.**

- a. Private
- b. Hybrid
- c. Virtual private
- d. Any of the above

The correct **answer** is b

**681. In a VPN, \_\_\_\_\_ encrypted.**

- a. The inner datagram is
- b. Neither the inner nor the outer datagram is
- c. The outer datagram is
- d. Both inner and outer datagrams are

The correct **answer** is d

**682. A \_\_\_\_\_ can forward or block packets based on the information in the network layer and transport layer headers.**

- a. Proxy firewall
- b. Message digest
- c. Packet-filter firewall
- d. Private key

The correct **answer** is c