**Multiple Choice. (100 pts.)**

1. Circuit switching can be divided into \_\_\_\_\_\_\_\_ categories.
   1. two
   2. three
   3. four
   4. None of the choices are correct
2. Packet switching can be divided into \_\_\_\_\_\_\_\_ categories.
   1. two
   2. three
   3. four
   4. None of the choices are correct
3. Circuit switching is normally used in \_\_\_\_\_\_\_\_\_\_\_ layer.
   1. physical
   2. data-link
   3. network
   4. application
4. Packet switching is normally used in \_\_\_\_\_\_\_\_\_\_\_ layers.
   1. physical and data-link
   2. data-link and network
   3. network and transport
   4. transport and application
5. Message switching is normally used in \_\_\_\_\_\_\_\_\_\_\_ layer.
   1. physical
   2. data-link
   3. network
   4. application
6. In a circuit-switching network, we have \_\_\_\_\_\_\_\_\_\_\_ phase(s).
   1. one
   2. two
   3. three
   4. None of the choices are correct
7. In a datagram network, we have \_\_\_\_\_\_\_\_\_\_\_ phase(s).
   1. one
   2. two
   3. three
   4. None of the choices are correct
8. In a virtual-switch network, we have \_\_\_\_\_\_\_\_\_\_\_ phase(s).
   1. one
   2. two
   3. three
   4. None of the choices are correct
9. In a \_\_\_\_\_\_\_\_\_\_\_ network, each packet is treated independently from all other packets.
   1. circuit-switched
   2. virtual-circuit
   3. datagram
   4. None of the choices are correct
10. In a datagram network, the routing table is based on the \_\_\_\_\_\_\_\_\_\_\_ in the packet.
    1. flow label
    2. destination address
    3. VCI
    4. None of the choices are correct
11. In a virtual-circuit network, the routing table is based on the \_\_\_\_\_\_\_\_\_\_\_ in the packet.
    1. flow label
    2. destination address
    3. VCI
    4. None of the choices are correct
12. In a datagram network, the destination address \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. remains the same from the source to the destination
    2. changes at each switch
    3. changes at the destination
    4. None of the choices are correct
13. In a datagram network, we need \_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase(s).
    1. tear-down
    2. setup
    3. setup and tear-down
    4. None of the choices are correct
14. In a virtual-circuit network, we need \_\_\_\_\_\_\_\_\_\_\_\_\_\_ phase(s).
    1. tear-down
    2. setup
    3. setup and tear-down
    4. None of the choices are correct
15. In a \_\_\_\_\_\_\_\_\_\_network, all packets in a message follow the same path.
    1. datagram
    2. virtual-circuit
    3. circuit-switched
    4. None of the choices are correct
16. In a \_\_\_\_\_\_\_\_\_\_network, each packet in a message may follow a different path.
    1. datagram
    2. virtual-circuit
    3. circuit-switched
    4. None of the choices are correct
17. In the \_\_\_\_\_\_\_ random-access method collision is avoided.
    1. CSMA/CD
    2. CSMA/CA
    3. ALOHA
    4. token-passing
18. In the 1-persistent approach, when a station finds an idle line, it \_\_\_\_\_\_\_.
    1. sends immediately
    2. waits 0.1 s before sending
    3. waits 1 s before sending
    4. waits a time equal to 1 − p seconds before sending
19. \_\_\_\_\_\_\_ requires one primary station and one or more secondary stations.
    1. Token ring
    2. Reservation
    3. Polling
    4. CSMA
20. In the p-persistent approach, when a station finds an idle line, it \_\_\_\_\_\_\_.
    1. sends immediately
    2. waits 1 s before sending
    3. sends with probability 1 − p
    4. sends with probability p
21. The 1-persistent approach can be considered a special case of the p-persistent approach with p equal to \_\_\_\_\_\_\_.
    1. 1.0
    2. 2.0
    3. 0.1
    4. 0.5
22. In the reservation access method, if there are 10 stations on a network, then there are \_\_\_\_\_\_\_ reservation minislots in the reservation frame.
    1. 10
    2. 11
    3. 5
    4. 9
23. \_\_\_\_\_\_\_ is a controlled-access protocol.
    1. FDMA
    2. TDMA
    3. CSMA
    4. Reservation
24. \_\_\_\_\_\_\_ is (are) a channelization protocol.
    1. FDMA
    2. TDMA
    3. CDMA
    4. All the choices are correct
25. In the \_\_\_\_\_\_\_ random-access method, stations do not sense the medium.
    1. CSMA/CA
    2. ALOHA
    3. CSMA/CD
    4. Ethernet
26. Which of the following is an example of a random-access protocol?
    1. Polling
    2. FDMA
    3. Token passing
    4. None of the choices are correct
27. Which of the following is an example of a controlled-access protocol?
    1. CDMA
    2. FDMA
    3. Token passing
    4. None of the choices are correct
28. The vulnerable time for a pure ALOHA is \_\_\_\_\_\_\_\_\_\_ the one for slotted ALOHA.
    1. less than
    2. greater than
    3. equal to
    4. None of the choices are correct
29. The vulnerable time for CSMA is \_\_\_\_\_\_\_\_\_\_\_.
    1. Tp
    2. 2 x Tp
    3. 3 x Tp
    4. None of the choices are correct
30. We need RTS and CTS packets in \_\_\_\_\_\_\_\_\_\_\_\_ protocol.
    1. CDMA/CA
    2. CDMA/CD
    3. token-passing
    4. None of the choices are correct
31. In FDMA, we use different \_\_\_\_\_\_\_\_\_\_\_ to achieve channelization.
    1. frequency ranges
    2. time slots
    3. codes
    4. None of the choices are correct.
32. In CDMA, we use different \_\_\_\_\_\_\_\_\_\_\_ to achieve channelization.
    1. frequency ranges
    2. time slots
    3. codes
    4. None of the choices are correct
33. In TDMA, we use different \_\_\_\_\_\_\_\_\_\_\_ to achieve channelization.
    1. frequency ranges
    2. time slots
    3. codes
    4. None of the choices are correct
34. Walsh tables are used in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. FDMA
    2. TDMA
    3. CDMA
    4. None of the choices are correct.
35. Three security goals are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. confidentiality, cryptography, and nonrepudiation
    2. confidentiality, encryption, and decryption
    3. confidentiality, integrity, and availability
    4. None of the choices are correct
36. Which of the following attacks is threatening integrity?
    1. Masquerading
    2. Traffic Analysis
    3. Denial of service
    4. None of the choices are correct
37. Which of the following attacks is threatening availability?
    1. Replaying
    2. Modification
    3. Denial of service
    4. None of the choices are correct
38. \_\_\_\_\_\_\_\_\_\_\_\_\_ means concealing the contents of a message by enciphering.
    1. Steganography
    2. Cryptography
    3. Compressing
    4. None of the choices are correct
39. \_\_\_\_\_\_\_\_\_\_\_\_\_\_means concealing the message by covering it with something else.
    1. Cryptography
    2. Steganography
    3. Compressing
    4. None of the choices are correct
40. In \_\_\_\_\_\_\_\_\_\_cryptography, the same key is used by the sender and the receiver.
    1. symmetric-key
    2. asymmetric-key
    3. public-key
    4. None of the choices are correct
41. In \_\_\_\_\_\_\_\_\_ cryptography, the same key is used in both directions.
    1. symmetric-key
    2. asymmetric-key
    3. public-key
    4. None of the choices are correct
42. \_\_\_\_\_\_\_\_\_ cryptography is often used for long messages.
    1. Symmetric-key
    2. Asymmetric-key
    3. Public-key
    4. None of the choices are correct
43. \_\_\_\_\_\_\_\_\_\_\_ cryptography is often used for short messages.
    1. Symmetric-key
    2. Asymmetric-key
    3. Secret-key
    4. None of the choices are correct
44. \_\_\_\_\_\_\_\_\_\_means that the sender and the receiver expect confidentiality.
    1. Nonrepudiation
    2. Integrity
    3. Authentication
    4. None of the choices are correct
45. \_\_\_\_\_\_\_\_\_\_\_ means that the data must arrive at the receiver exactly as they were sent.
    1. Nonrepudiation
    2. Message integrity
    3. Authentication
    4. None of the choices are correct
46. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ can provide authentication, integrity, and nonrepudiation for a message.
    1. Encryption/decryption
    2. Digital signature
    3. Compression
    4. None of the choices are correct
47. Digital signature does not provide \_\_\_\_\_\_\_\_\_.
    1. nonrepudiation
    2. privacy
    3. authentication
    4. Provides all of the choices
48. In \_\_\_\_\_\_\_\_\_\_\_, the identity of a party is verified once for the entire duration of system access.
    1. entity authentication
    2. message integrity
    3. message authentication
    4. None of the choices are correct
49. In \_\_\_\_\_\_\_\_\_\_ cryptography, everyone has access to everyone's public key.
    1. symmetric-key
    2. asymmetric-key
    3. secret-key
    4. None of the choices are correct
50. After a message is encrypted, it is called \_\_\_\_\_\_\_.
    1. plaintext
    2. ciphertext
    3. cryptotext
    4. None of the choices are correct
51. In the asymmetric-key method used for confidentiality, which key is publicly known?
    1. Encryption key only
    2. Decryption key only
    3. Both keys
    4. None of the choices are correct
52. In the asymmetric-key method used for confidentiality, the receiver uses his/her own \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to decrypt the message.
    1. private key
    2. public key
    3. no key
    4. None of the choices are correct
53. The RSA algorithm for confidentiality uses \_\_\_\_\_\_\_ cryptography.
    1. asymmetric-key
    2. symmetric-key
    3. substitution
    4. None of the choices are correct
54. In RSA, if user A wants to send an encrypted message to user B, the plaintext is encrypted with the public key of \_\_\_\_\_\_\_.
    1. user A
    2. user B
    3. the network
    4. None of the choices are correct
55. In the digital signature technique when the whole message is signed using an asymmetric key, the sender of the message uses \_\_\_\_\_\_\_ to sign the message.
    1. his or her own symmetric key
    2. his or her own private key
    3. his or her own public key
    4. None of the choices are correct
56. In the digital signature technique when the whole message is signed using an asymmetric key, the receiver of the message uses \_\_\_\_\_\_\_ to verify the signature.
    1. her or his own public key
    2. her or his own private key
    3. the sender's public key
    4. None of the choices are correct
57. A \_\_\_\_\_\_\_ is a trusted third party that solves the problem of symmetric-key distribution.
    1. CA
    2. KDC
    3. TLS
    4. firewall
58. A \_\_\_\_\_\_\_ certifies the binding between a public key and its owner.
    1. CA
    2. KDC
    3. TLS
    4. None of the choices are correct
59. Which of the following statements about wired and wireless LANs is correct?
    1. Both operate in the lower two layers of the TCP/IP protocol suite.
    2. Wired LANs operate in the lower two layers and wireless LANs operate in the lower three layers of the TCP/IP protocol suite.
    3. Wired LANs operate in the lower three layers and wireless LANs operate in the lower two layers of the TCP/IP protocol suite.
    4. Both operate in the lower three layers of the TCP/IP protocol suite.
60. IEEE has defined the specifications for a wireless LAN, called \_\_\_\_\_\_\_, which covers the physical and data-link layers.
    1. IEEE 802.3
    2. IEEE 802.5
    3. IEEE 802.11
    4. IEEE 802.2
61. The CSMA/CD algorithm does not work in wireless LAN because
    1. wireless host does not have enough power to work in a duplex mode.
    2. of the hidden station problem.
    3. signal fading could prevent a station at one end from hearing a collision at the other end.
    4. all of the choices are correct.
62. In IEEE 802.11, a \_\_\_ is made of stationary or mobile wireless stations and an optional central base station, known as the access point (AP).
    1. ESS
    2. BSS
    3. CSS
    4. None of the choices are correct
63. In IEEE 802.11, a BSS without an AP is called \_\_\_\_\_\_\_\_\_.
    1. an ad hoc architecture
    2. an infrastructure network
    3. either an ad hoc architecture or an infrastructure network
    4. None of the choices are correct
64. In IEEE 802.11, a BSS with an AP is sometimes referred to as \_\_\_\_\_\_\_\_\_\_\_\_.
    1. an ad hoc architecture
    2. an infrastructure network
    3. either an ad hoc architecture or an infrastructure network
    4. None of the choices are correct
65. In IEEE 802.11, communication between two stations in two different BSSs usually occurs via two \_\_\_\_\_\_\_\_.
    1. BSSs
    2. ESSs
    3. APs
    4. None of the choices are correct
66. In IEEE 802.11, a station with \_\_\_\_\_\_\_\_ mobility is either stationary (not moving) or moving only inside a BSS.
    1. no-transition
    2. BSS-transition
    3. ESS-transition
    4. None of the choices are correct
67. In IEEE 802.11, a station with \_\_\_\_\_\_\_\_mobility can move from one BSS to another, but the movement is confined inside one ESS.
    1. no-transition
    2. BSS-transition
    3. ESS-transition
    4. None of the choices are correct
68. In IEEE 802.11, a station with \_\_\_\_\_\_\_\_ mobility can move from one ESS to another.
    1. no-transition
    2. BSS-transition
    3. ESS-transition
    4. None of the choices are correct
69. In IEEE 802.11, distributed coordination function (DCF) uses \_\_\_\_\_\_\_ as the access method.
    1. CSMA/CA
    2. CSMA/CD
    3. ALOHA
    4. None of the choices are correct
70. In IEEE 802.11, when a frame is going from one station in a BSS to another station in the same BSS, the address flag is \_\_\_\_\_.
    1. 00
    2. 01
    3. 10
    4. 11
71. In IEEE 802.11, when a frame is coming from an AP and going to a station, the address flag is \_\_\_\_\_\_\_.
    1. 00
    2. 01
    3. 10
    4. 11
72. In IEEE 802.11, when a frame is going from a station to an AP, the address flag is \_\_\_\_\_.
    1. 00
    2. 01
    3. 10
    4. 11
73. In IEEE 802.11, when a frame is going from one AP to another AP in a wireless distribution system, the address flag is \_\_\_\_\_.
    1. 00
    2. 01
    3. 10
    4. 11
74. In IEEE 802.11, the access method used in the PCF sublayer is \_\_\_\_\_\_.
    1. contention
    2. controlled
    3. polling
    4. None of the choices are correct
75. In IEEE 802.11, the \_\_\_\_\_\_ is a time period used for collision avoidance.
    1. NAV
    2. BSS
    3. ESS
    4. None of the choices are correct
76. In IEEE 802.11, the addressing mechanism can include up to \_\_\_\_\_\_addresses.
    1. four
    2. five
    3. six
    4. None of the choices are correct
77. The original IEEE 802.11 uses \_\_\_\_\_\_\_\_\_.
    1. FHSS
    2. DSSS
    3. OFDM
    4. either FHSS or DSSS
78. The IEEE 802.11a uses \_\_\_\_\_\_\_\_\_.
    1. FHSS
    2. DSSS
    3. OFDM
    4. either FHSS or DSSS
79. The IEEE 802.11b uses \_\_\_\_\_\_\_\_\_.
    1. FHSS
    2. DSSS
    3. OFDM
    4. either FHSS or DSSS
80. The IEEE 802.11g uses \_\_\_\_\_\_\_\_\_.
    1. FHSS
    2. DSSS
    3. OFDM
    4. either FHSS or DSSS
81. The IEEE 802.11 FHSS uses \_\_\_\_\_\_ modulation.
    1. ASK
    2. FSK
    3. PSK
    4. None of the choices are correct
82. The IEEE 802.11 or IEEE 802.11b DSSS uses \_\_\_\_\_\_ modulation.
    1. ASK
    2. FSK
    3. PSK
    4. None of the choices are correct
83. The IEEE 802.11a, IEEE 802.11g, or IEEE 802.11n OFDM uses \_\_\_\_\_\_ modulation.
    1. ASK
    2. FSK
    3. PSK
    4. None of the choices are correct
84. Bluetooth is a \_\_\_\_\_\_\_ technology that connects devices (called gadgets) in a small area.
    1. wired LAN
    2. wireless LAN
    3. VLAN
    4. None of the choices are correct
85. In Bluetooth, multiple \_\_\_\_\_\_\_\_ form a network called a \_\_\_\_\_\_\_\_\_.
    1. scatternet; piconets
    2. piconets: scatternet
    3. piconets: bluenet
    4. bluenet; scatternet
86. A Bluetooth network consists of \_\_\_\_\_ primary device(s) and up to \_\_\_\_ secondary devices.
    1. one; five
    2. five; three
    3. two; six
    4. one; seven
87. In Bluetooth, the current data rate is \_\_\_\_Mbps.
    1. 2
    2. 5
    3. 11
    4. None of the choices are correct
88. The access method in Bluetooth is \_\_\_\_\_\_\_\_.
    1. FDMA
    2. TDD-TDMA
    3. CDMA
    4. None of the choices are correct
89. In Bluetooth, the \_\_\_\_\_ link is used when data integrity is more important than avoiding latency.
    1. SCO
    2. ACL
    3. ACO
    4. SCL
90. Bluetooth uses \_\_\_\_\_\_ in the physical layer to avoid interference from other devices or other networks.
    1. DSSS
    2. FHSS
    3. FDMA
    4. None of the choices are correct
91. Transmission media are usually categorized as \_\_\_\_\_\_\_.
    1. fixed or unfixed
    2. guided or unguided
    3. determinate or indeterminate
    4. metallic or nonmetallic
92. Transmission media lie below the \_\_\_\_\_\_\_ layer.
    1. physical
    2. network
    3. transport
    4. application
93. Twisting in a twisted-pair help reduce the \_\_\_\_\_\_\_\_\_\_.
    1. length
    2. cost
    3. noise
    4. None of the choices are correct.
94. Noise in a coaxial cable is reduced by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
    1. twisting the cable
    2. the outer conductor
    3. the inner conductor
    4. None of the choices are correct.
95. UTP and STP are different implementations of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cable.
    1. twisted-pair
    2. coaxial
    3. fiber-optic
    4. None of the choices are correct.
96. RJ-45 is a type of connectors used in \_\_\_\_\_\_\_\_\_ cabling.
    1. twisted-pair
    2. coaxial
    3. fiber-optic
    4. None of the choices are correct.
97. RG rating is used in \_\_\_\_\_\_\_\_\_ cable.
    1. twisted-pair
    2. coaxial
    3. fiber-optic
    4. None of the choices are correct.
98. SC and TP are two types of connectors used in \_\_\_\_\_\_\_\_\_ cabling.
    1. twisted-pair
    2. coaxial
    3. fiber-optic
    4. None of the choices are correct.
99. The infrared wave has frequencies \_\_\_\_\_\_\_\_ microwave.
    1. below
    2. above
    3. the same as
    4. None of the choices are correct.
100. In IEEE 802.11, the addressing mechanism can include up to \_\_\_\_\_\_addresses.
     1. four
     2. five
     3. six
     4. None of the choices are correct