----------chapter 1 ----------

1. Which of the following description about OSI layers is incorrect?
   A. The application layer contains a variety of protocols that are commonly needed by users
   B. The transport layer is concerned with the syntax and semantics of the information transmitted.
   C. The network layer controls the operation of the subnet and determines how packets are routed from source to destination
   D. The data link layer is to transform a raw transmission facility into a line that appears free of undetected transmission errors.

2. The three central concepts of the OSI model are _____.
   A. services, interfaces and protocols B. architecture, model and switching
   C. subnet, layering and port D. protocols, layers and interfaces

3. Once upon a time, people thought that the OSI model and its protocols were going to take over the world and push everything else out of their way. This did not happen. Why? A look back at some of the reasons may be useful. They can be summarized as following except for _____:
   A. Bad timing. B. Bad technology. C. Bad price. D. Bad implementations.

4. _____means that the switch or router must receive the entire packet before it can begin to transmit the first bit of the packet onto the outbound link.
   A. Queuing delay
   B. Store-and-forward transmission
   C. Packet switching
   D. Propagation

5. Suppose a system has a four layer protocol hierarchy. Applications generate messages of length 320bytes. At each of the layers (including topper and bottom layers), an 20byte header is added. What fraction of the network bandwidth is filled with headers?
   A. 0.20 B. 0.25 C.0.30 D. 0.40

----------chapter 2 ----------

6. In the _____ system, the users take turns, each one periodically getting the entire bandwidth for a little burst of time.
   A. FDM B. TDM C. WDM D. CDM

7. Television channels are 4 MHz wide. How many bits/sec can be sent if sixteen-level digital signals are used? Assume a noiseless channel.
   A. 16Mbps B. 24Mbps C. 32Mbps D.40Mbps

8. If a binary signal is sent over a 3-kHz channel whose signal-to-noise ratio S/N is 31, what is the maximum achievable data rate?
   A. 6 kbps B. 12 kbps C. 15 kbps D. 18 kbps

9. In packet switching, circuit switching, and message switching, which one does not utilize store-and-forward transmission technology?
   A. packet switching B. circuit switching
   C. message switching D. none of above

10. Which protocol does not belong to the data link layer?
   A. HDLC B. ICMP C. PPP D. SDLC

11. Which of the following factors does not affect the channel data transfer rate ( )?
   A. Signal to noise ratio B. Frequency Bandwidth
   C. Modulation rate D. Signal propagation speed

12. A noisy channel has a bandwidth of 4 KHZ, its S/N ratio is 511, then its maximum data rate will be _____ .
   A. 36 kbps B. 32 kbps C. 63 kbps D. NONEOF ABOVE

13. Which one can be used as a key component of optical transmission system?
   A. UTP B. semiconductor laser device
   C. HUB D. WiFi router

14. The cable between toll office and the end office of telephone company are known as the _____.
   A. local loop B. trunk C. microwave line D. coaxial cable

15. It is impossible for _____ to cause transmission impairments of telephone local loop.
   A. different Fourier components propagating at different speed
   B. thermal noise
   C. crosstalk between two close wires
   D. multipath fading

16. An T1 channel contains 24 PCM signals, its data rate is .
   A. 2.048 Mbps B. 1.544 Mbps
   C. 64kbps D. 2.5 Gbps

----------chapter 3 ----------

17. Bit string 1110111111101 will become _____ after bit stuffing.
   A. 11101111011101 B. 11101111101101
   C. 1110111111101 D. 11101111110101

18. Which field of PPP frame can be omitted to improve efficiency during frame transmission?
   A. checksum B. control C. protocol D. length

19. What is the remainder obtained by dividing x^7+x^5+1 by the generator polynomial x^3+1?
   A. 110 B. 011 C. 111 D. None of above

20. Which is not a correct method to build VLANs?

A. Every port of switch is assigned a VLAN ID;

B. Every port of switch is assigned a TCP port number;

C. Every MAC address is assigned a VLAN ID;

D. Switch ports sending and receiving payload of the same layer 3 protocol are assigned the same VLAN ID;

21. With Hamming code, the code which can correct 3 bit errors at most may detect at most _____ error(s).

A. 5 B.6 C.7 D. 8

22. What is the remainder obtained for a frame 1101011111 using the generator polynomial $G(x)= x^4 + x+ 1$?

A. 0101 B. 0110 C. 0010 D. 1100

23. What is the maximum sending window size of the selective repeat protocol when use 3 bits for frame serial number?

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

24. The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is known as _____.

A. acknowledging B. piggybacking C. go-backing D. hooking

----------chapter 4 ----------

25. What is the baud rate of classic 10-Mbps Ethernet?

A. 10M B. 15M C. 20M D. 25M

26. According to CSMA/CD, if the propagation time of the line is 100ms, the transmission time of the frame must not less than:

A. 100ms B. 200ms C. 400ms D. 500ms

27. The Ethernet uses an algorithm called binary exponential back-off, after 3 collisions, the station will chose a random number between 0 and _____.

A. 7 B. 8 C. 15 D. 16

28. The hosts connected by a single new router may belong to

A. the same collision domain and the same broadcast domain

B. the same collision domain but different broadcast domains

C. the same broadcast domain but different collision domains

D. different collision domains and different broadcast domains

29. After the sender first sends frames from 0 to 8 and at the end of timeout receives the acknowledgments for frame 1, 3, and 5, the next frame it will retransmit is frame _____. (assume the protocol is go-back-n and the acknowledgment number indicates the last frame number received correctly.)

A. 2 B. 4 C. 6 D. 7

30. Which is not the CSMA / CA rule of 802.11?

A. If station X received RTS of station A, X must remain silent for a short time so that X will not interfere with A's receipt of CTS.

B. If station X received RTS, but did not receive CTS, then X can transmit its data and will not interfere with other stations. 。

C. If station X has not received RTS, but received CTS, then X may not transmit its data..

D. If station X has received both RTS and CTS, then X may transmit its data.

31. When a switch is set up port-based VLANs, which feature is impossible to achieve?

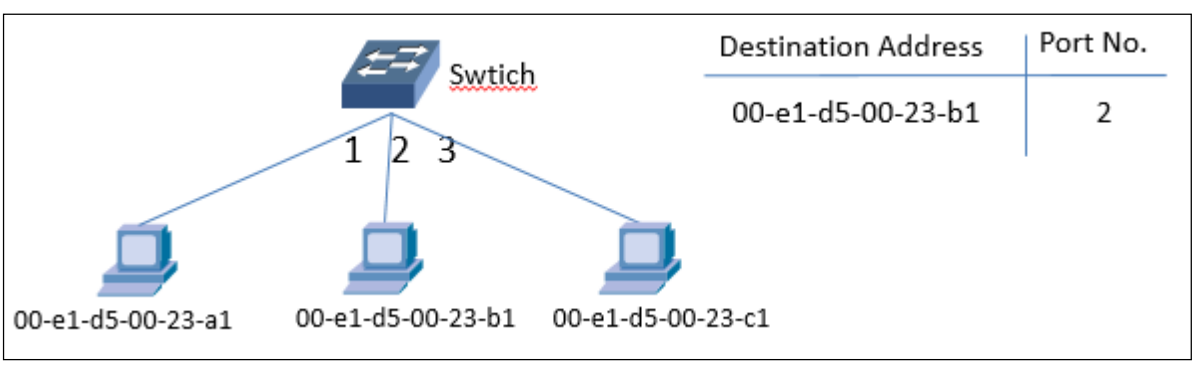
A. A port belongs to two different VLANs

B. Ports on different switches belongs to a same VLAN

C. IP-Sec encryption

D. Multicast function

32. An Ethernet topology and the current forwarding table of the switch are shown in the following figure. Hosts 00-e1-d5-00-23-a1 send a data frame to host 00-e1-d500-23-c1. After receiving this frame, host 00-e1-d5-00-23-c1 sends host 00-e1-d5-00-23-a1 a confirmation frame. The forwarding ports of the two frames on the switch are ().



A. {3} and {1} B. {2,3} and {1} C. {2,3} and {1,2} D. {1,2, 3} and {1}

----------chapter 5 ----------

33. Which is not the private address that will not appear in Internet datagram?

A. 10.3.18.82 B. 192.168.8.3

C. 10.0.0.1 D. 172.33.8.8

34. Which protocol is used in command "ping 10.214.8.9"?

A. ARP B. ICMP

C. RARP D. ECHO

35. _____ is not a legal IPV6 address.

A. 2A00::1345:A367:892B:24E0 B. 1382:4567:89AB:CDEF

C. ::124.21.50.48 D. 2A43:0000:0000:0000:0123:4567:89AB:CDEF

36. RIP is a _____ .
    A. Interior Gateway Protocol B. Exterior Gateway Protocol
    C. static routing protocol D. link state routing protocol

37. Which of the following devices is needed for a packet to be passed from one LAN to Internet?
    A. Bridge B. Router
    C. Switch D. Hub

38. Which one is not a part of link-state routing?
    A. A router discovers its neighbors and learns their network addresses.
    B. Measure the delay or cost to each of its neighbors.
    C. Exchange routing table with its neighbors.
    D. Construct a packet telling all it has just learned.

39. What is the valid host range for subnet 222.101.10.32, mask 255.255.255.252?
    A. 202.101.10.0 through 202.101.10.255
    B. 202.101.10.32 through 202.101.10.63
    C. 202.101.10.33 through 202.101.10.62
    D. 202.101.10.33 through 202.101.10.34

40. A router has the following (CIDR) entries in its routing table:

Address	mask	Next hop
135.46.64.0	255.255.192.0	192.168.0.1
135.46.80.0	255.255.240.0	172.16.0.1
135.46.128.0	255.255.224.0	10.0.0.1
0.0.0.0	0.0.0.0	123.0.0.1

    Which is the next hop if a packet with the destination address 135.46.125.80 arrives?
    A. 192.168.0.1 B. 10.0.0.1 C. 172.16.0.1 D. 123.0.0.1

41. _____ is a dynamic mapping protocol in which a MAC address is found for an IP address .
    A. RARP
    B. ARP
    C. ICMP
    D. None of the above

42. Which utility program is designed to find the routers along the path from the host to a destination IP address.?
    A. traceroute
    B. ping
    C. ttcp
    D. Netstate

43. The IP protocol provides for _____ service.

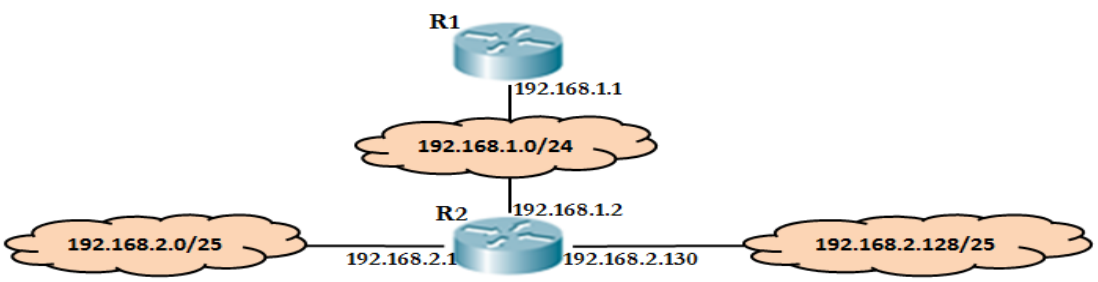
A. reliable and connection-oriented
B. non-routable
C. unreliable and connectionless
D. none of the above

44. The subnet mask for a network is 255.255.255.224. How many valid host addresses are available? (Disregard special addresses)
A. 14 B. 16 C. 30 D. 32

45. If a host with IP address 120.10.77.55 and mask 255.255.252.0 wants to send a broadcast packet in its subnet, the destination address of the packet is _____.
A. 120.10.76.0 B. 120.10.76.255 C. 120.10.77.255 D. 120.10.79.255

46. In the TCP / IP reference model, _____ provides a direct service for ICMP.
A. PPP B. IP C. UDP D. TCP

47. There is a network as following figure. Router R1 has only a route to subnet192.168.1.0/24. In order to making R1 can route to all subnet in the figure, which routing information（destination network, mask, next hop) should be added in R1:



A. 192.168.2.0 255.255.255.128 192.168.1.1
B. 192.168.2.0 255.255.255.0 192.168.1.1
C. 192.168.2.0 255.255.255.128 192.168.1.2
D. 192.168.2.0 255.255.255.0 192.168.1.2

----------chapter 6 ----------

48. Which of the following does UDP guarantee?
A. Sequence numbers on each user datagram
B. Acknowledgements to the sender
C. Flow control
D. None of the above

49. Host A sends host B a TCP segment (SYN＝1，seq＝220) for establishing a connection. Which is the possible segment that host B then correctly sends if host B received the connection request?
A. (SYN＝0，ACK＝0; seq＝221，ack＝221)
B. (SYN＝1，ACK＝1; seq＝220，ack＝220)
C. (SYN＝1，ACK＝1; seq＝221，ack＝221)
D. (SYN＝0，ACK＝0; seq＝220，ack＝220)

50. When a host receives a TCP segment with an acknowledgement number as 500, it means _____.
    A. TCP Segment 499 has been received
    B. TCP Segment 500 has been received
    C. The bytes up to and including 499 has been received
    D. The bytes up to and including 500 has been received

51. For TCP 3-way handshake connection establishment, which of the following combination is for the second-way (Connection Accepted)?
    A. SYN=1,ACK=1 B. SYN=1,ACK=0
    C. SYN=-0,ACK=1 D. SYN=0,ACK=0

52. Suppose that the TCP congestion window is set to 18 KB and a timeout occurs. How big will the window be if the next six transmission bursts are all successful? Assume that the maximum segment size is 1 KB.
    A. 9 KB B. 10 KB C. 16KB D. 32B

Host A continuously sends host B two TCP segments, which sequence number is 100 and 220. Please answer following 4 questions:

53. How many bytes of data does the first segment bring?
    A. 99 B. 100 C. 120 D. 220

54. What is the acknowledgment number which host B sends after the first message is successfully received?
    A. 99 B. 100 C. 120 D. 220

55. Assume the acknowledgment number which host B sends after the second message is successfully received, is 340. How many bytes of data is there in the second segment which host A sent?
    A. 99 B. 100 C. 120 D. 220

56. Assume the first segment which host A sent is lost, but the second reached host B and then host B sends host A an acknowledgment. What is the acknowledgment number?
    A. 99 B. 100 C. 120 D. 220

----------chapter 7 ----------

57. The resolver in DNS client sends a packet to a _____, which then looks up the name and returns the ip address to the resolver.
    A. proxy name server B. authoritative name server
    C. local name server D. top-level name server

58. Which protocol does not match its well-known port?
    A.POP3 vs 120 B. Telnet vs 23
    C.FTP vs 21 D. SMTP vs 25

59. Which is used to keep track of a user and its related information by the Web server?

A. web cache B. persistent connection
C. cookie D. conditional GET

60. HTML tag _____ is used to define a hyperlink .
A. <input name="…"> B. <a href="…" >
C. <form name="…" > D. <img src="…" >

61. _____ is a small java program that has been compiled into binary instruction running in JVM, and can be embedded into HTML pages, interpreted by JVM-capable browsers.
A. JavaScript B. JavaBean C. Applet D. JSP

62. In the following descriptions about HTTP, which one is not correct?
A. HTTP uses non-persistent connections in its default mode.
B. HTTP uses TCP as its underlying transport protocol.
C. HTTP is a stateless protocol.
D. HTTP is client-server architecture.

63. When a user clicks on a hyperlink, http://www.zju.edu.cn/lib/index.html, the browser carries out a series of steps in order to fetch the page pointed to. Which one is not in these steps?
A.) The browser determines the URL
B.) The browser asks DNS for the IP address of www.zju.edu.cn
C.) The browser sends a UDP request asking for file /lib/index.html
D.) The browser displays all the text in index.html

64. The popularity of the Web has almost been its undoing. Servers, routers, and lines are frequently overloaded. In order to improving performance of accessing Web pages, we can use following techniques except for _____.
A. caching B. server replication
C. tunneling D. content delivery networks

65. Which protocol is perhaps not to be used when using a browser to access a university Web site homepage?
A. PPP B. ARP C. UDP D. SMTP

----------chapter 8 ----------

66. Cipher block chaining can be used to prevent attack to _____ .
A. RSA B. AES C. SHA-1 D. PGP

67. Which key is used to decrypt data when using public-key cryptography?
A. The sender's public key
B. The sender's private key
C. The receiver's public key
D. The receiver's private key

68. Which key is the browser used to verify the certificate of the website?
A. The public key of the website

B. The private key of the browser
C. The public key of the CA
D. The private key of the website

69. The purpose of _____is to determine whom you are talking to before revealing sensitive information or entering into a business deal
A. secrecy
B. integrity control
C. authentication
D. Nonrepudiation

70. The main public-key algorithm is _____ which derives its strength from the fact that it is very difficult to factor large numbers.
A. DES B. AES C. MD5 D. RSA

For following 5 questions，please calculate the transmission delay and the propagation delay: Transmission distance between the sending and receiving ends is 1000km. Signal propagation speed in the media is $2x10^8$m/s.

71. If the data length is 10^7bits and the data transmission rate is 100kbps，then the transmission delay is ____.
A. 1s B. 10s C. 10s D. 100s

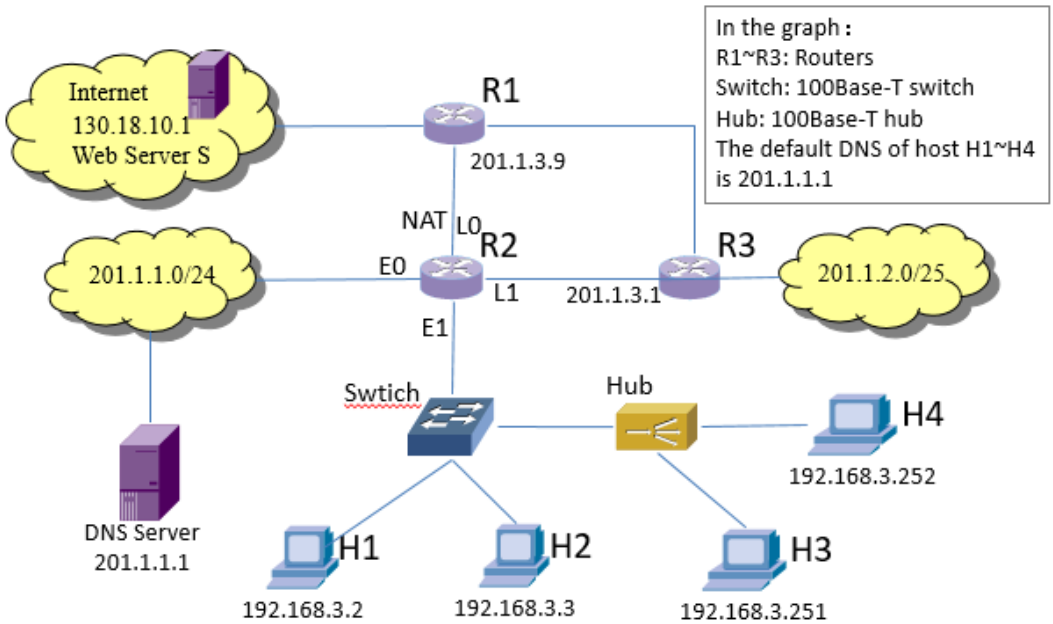
72. If the data length is 10^7bits and the data transmission rate is 100kbps，then the propagation delay is _____.
A. 10s B. 1s C. 50ms D. 5ms

73. If the data length is 10^3bits and the data transmission rate is 1Gbps，then the transmission delay is ____.
A. 10s B. 1s C. 1ms D. 1μs

74. If the data length is 10^3bits and the data transmission rate is 1Gbps，then the propagation delay is _____.
A. 10s B. 1s C. 50ms D. 5ms

75. What conclusion you can get from above results?
A. If the data length is short and transmission rate is low, transmission delay is often greater than the propagation delay in total delay.
B. If the data length is long and the transmission rate is high, the propagation delay may be the main part in total delay.
C. If the data length is long and transmission rate is low, transmission delay is often greater than the propagation delay in total delay.
D. If the data length is short and the transmission rate is high, the transmission delay may be the main part in total delay.

Please use this diagram to answer the following 8 questions.



76. In following OSI reference model, R1, Switch and Hub can achieve the highest functional layers are respectively _____.

A. 2, 2, 1 B. 2, 2, 2 C. 3，2, 1 D. 3, 2, 2

77. If the bandwidth of the link between R2 and R3 is 8 kHz, and the SNR(Signal and Noise ratio) is 30 dB, the actual data transfer rate of the link is about 50% of the theoretical maximum data transfer rate based on Shannon's theorem, then the actual data transmission speed is about _____.

A. 8kbps B. 20kbps C. 40kbps D. 80kbps

78. If H2 sends H4 a data frame and immediately H4 sends H2 a confirmation frame, in addition to the H4, which host(s) can receive the confirmation frame from the physical layer?

A. only H2 B. only H3 C. only H1 and H2 D. only H2 and H3

79. If Hub will cause 1.535μs delay when it reproduces bit stream, the signal propagation speed is 200m/μs. Regardless of the Ethernet frame preamble, the theoretical maximum distance between H3 and H4 is _____.

A. 200m B. 205m C. 359m D. 512m

80. Assume that R1, R2 and R3 use RIP protocol to exchange routing information and have been convergence. Link metric is based on hop count. R3 detects that the network 201.1.2.0/25 is unreachable and informs R2 of a new distance vector. What is the distance between R2 and the network 201.1.2.0/25 after R2 is updated?

A. 2 B. 3 C. 16 D. 17

81. Assume that two interfaces composing any link among R1，R2 and R3 use a pair of IP addresses in the form of 201.1.3.x/30. When H3 accesses the Web server S, the source and destination IP addresses of the encapsulated HTTP request packet forwarded by R2 are _____.

A.192.168.3.251， 130.18.10.1 B. 192.168.3.251， 201.1.3.9

C. 201.1.3.8, 130.18.10.1 D. 201.1.3.10， 130.18.10.1

82. Assuming that the default gateway and subnet mask for H1 and H2 are configured as 192.168.3.1 and 255.255.255.128 respectively, the default gateway and subnet mask for H3 and H4 are configured as 192.168.3.254 and 255.255.255.128, respectively. The following possible situation happened is:
A. H1 cannot communicate with H2 for normal IP
B. Both H2 and H4 cannot access the Internet
C. H1 cannot communicate with H3 for normal IP
D. H3 cannot communicate with H4 for normal IP

83. Assume that all domain name servers use iterative query for domain name resolution. When H4 attempts to access the website *www.abc.xyz.com* and the domain name resolution is completed, the possible minimum and maximum number of DNS queries issued by the domain name server 201.1.1.1 are _____.
A. 0，3　　B. 1，3　　C. 0，4　　D. 1，4

========== ==========

84. Which description is correct about router configuration command "ip nat inside"?
A. It starts a router interface working as firewall.
B. It starts a router interface working as an Intranet interface of NAT box.
C. It shows the internal NAT address and port information of a router.
D. It changes the packet transmission direction of a NAT router.

85. Which of the following commands can be used to display middle routers to a destination host?
A. nslookup　　B. tracert　　C.arp　　D.netstat

86. Some broadcast systems also support transmission to a subset of the machines, which is known as _____.
a) A. unicasting　　B. broadcasting
b) C. multicasting　　D. anycasting

87. Which is not provided by the data link layer of the OSI model?
A. framing　　B. flow control
C. error control　　D. congestion control

88. In the _____ system, the users take turns, each one periodically getting the entire bandwidth for a little burst of time.
A. FDM　　B. TDM
C. WDM　　D. CDM

89. Which is used to keep track of a user and its related information by the Web server?
A. web cache　　B. persistent connection
C. cookie　　D. conditional GET

90. A telephone switch is a good example of _____ switching.

A. packet B. buffer
C. fabric D. circuit

91. There are two types of transmission technology that are in widespread use. They are Point-to-point links and _____ .
A. Broadcast links. B. end-to-end links
C. peer-to-peer links D. virtual links.

========== transport layer =========

92. Host A and B use TCP slow start algorithm through a network with 10-msec round-trip time and no congestion. The receiving window is 14 KB and the maximum segment size is 1 KB. At time t0, A begins to send segment, and application layer process of B begins to repeatedly fetch TCP data with a frequency of 100 ms interval. After t0, How long does it take before the receiving buffer of B is full?
A. 60 ms B. 50 ms C. 40 ms D. 80ms

93. Which is not the feature of TCP connections?
A. full-duplex B. three-way handshake
C. It is a byte stream. D. supporting broadcast

94. In the socket programming model, which primitive will block the caller until a connection attempt arrives?
A. connect B. accept C. listen D. send

95. is based on UDP.
A. POP B. FORM C. TELNET D. RTP

========== application layer =========

96. Which one is not a legal resource record of DNS server?
A. www.zju.edu.cn 86400 IN SOA star boss (43271,7200,7200,2347,8792)
B. zju.edu.cn 86400 IN TXT "Zhejiang university in HANGZHOU"
C. zju.edu.cn 86400 IN MX www.zju.edu.cn
D. www.intel.com 86400 IN A 218.58.102.17

97. When you configure static IP address parameters: IP address, subnet mask, default gateway, IP address relating to DNS, which name server's IP address is used?
A. proxy name server B. authoritative name server
C. local name server D. top-level name server

98. A file containing popular song is delivered in email, it will be encoded as MIME message and its MIME type/subtype will be _____ most possibly.
A. Audio/basic B. MIME/audio
C. Message/music D. Message/rfc822

99. HTML tag _____ can be used to accept user submitted data.

A. <A href=… > B. < input >

C. <table > D. <Li >

100. Which key will be used if A wants to send encrypted data to B when using public-key algorithms?

A. The public key of A B. The private key of A

C. The public key of B D. The private key of B