

2003 年

I. Please choose true(✓) or false(×) for the following questions (20x1 points)

- () 1. X A goal that is starting to become more important is doing business with consumers over the Internet. This sector is expected to grow quickly in the future. It is called m-commerce.
- () 2. X One type of person-to-person communication often goes by the name of end-to-end communication, to distinguish it from the client-server model.
- () 3. X P2P, full name is Person-to-person.
- () 4. V Connection-oriented service is modeled after the telephone system. In contrast, connectionless service is modeled after the postal system.
- () 5. X Shannon's major result is that the maximum data rate of a noisy channel whose bandwidth is H Hz, and whose signal-to-noise ratio is S/N , is given by Maximum number of baud/sec = $H \log_2 (1+S/N)$
- () 6. V ADSL stands for Asymmetric Digital Subscriber Line.
- () 7. X When you or your computer places a telephone call, the switching equipment within the telephone system seeks out a physical path all the way from your telephone to the receiver's telephone. This technique is called message switching.
- () 8. X Rate-based flow control, the receiver sends back information to the sender giving it permission to send more data or at least telling the sender how the receiver is doing.
- () 9. V Protocols in which the sender waits for positive acknowledgement before advancing to the next data item are often called PAR or ARQ.
- () 10. V Go back N, is for the receiver simply to discard all subsequent frames, sending no acknowledgments for the discarded frames.
- () 11. V CSMA/CD is the abbreviation for Carrier Sense Multiple Access with Collision Detection.
- () 12. X The problem of a station not being able to detect a potential competitor for the medium because the competitor is too far away is called the exposed station problem. The reverse situation is called the hidden station problem.
- () 13. V With Manchester encoding, each bit period is divided into two equal intervals. A binary 1 bit is sent by having the voltage set high during the first interval and low in the second one. A binary 0 is just the reverse: first low and then high.
- () 14. X Repeaters, hubs, bridges, switches, routers, and gateways operate in different layers. In particular, routers operate in the data link layer.
- () 15. X IETF has devised a simpler approach to quality of service, one that can be largely implemented locally in each router without advance setup and without having the whole path involved. This approach is known as flow-based quality of service.
- () 16. V We focused on adding a label in front of each packet and doing the routing based on the label rather than on the destination address. This "new" switching idea goes by various names, including label switching and tag

switching. Eventually, IETF began to standardize the idea under the name MPLS (MultiProtocol Label Switching).

- () 17. ☒ How do IP addresses get mapped onto data link layer address, such as Ethernet? The protocol used for asking this question and getting the reply is called RARP .
- () 18. ☒ When a packet is lost on a wired network, the sender should slow down. When one is lost on a wireless network, the sender should try harder. When the sender does not know what the network is, it is difficult to make the correct decision.
- () 19. ☒ In RFC 822 header fields, Cc: meaning E-mail address of secondary recipient(s), Bcc: meaning E-mail address for carbon copies.
- () 20. ☒ An organization that certifies public keys is now called a CA(Certification Authority).

II. Please select one choice for every question. (30x1 points)

1. If we look at the _____ model in detail, we see that two process are involved, one on the client machine and one on the server machine. Communication takes the form of the client process sending a message over the network to the server process. The client process then waits for a reply message. When the server process gets the request, it performs the requested work or looks up the requested data and sends back a reply.
(a) point-to-point (b) ☒ client-server (c) end-to-end (d) peer-to-peer
2. If a traveler plugs a notebook computer into the telephone jack in a hotel room, he has _____ network.两个答案
(a) ☒ wired/fixed (b) ☒ wired/mobile (c) wireless/fixed (d) wireless/mobile
3. When a packet is sent from one router to another via one or more intermediate routers, the packet is received at each intermediate router in its entirety, stored there until the required output line is free, and then forwarded. A subnet organized according to this principle is called a _____ subnet.
(a) circuit-switched (b) ☒ store-and-forward (c) message-switched (d) soft-switched
4. Nyquist proved that if an arbitrary signal has been run through a low-pass filter of bandwidth H, the filtered signal can be completely reconstructed by making only _____ (exact) samples per second.
(a) H (b) ☒ 2H (c) 3H (d) 4H
5. PCM, full name is _____ Code Modulation.
(a) ☒ Pulse (b) Packet (c) Point (d) Peer
6. A PPP frame includes fields flag, address, control, _____, payload and checksum.
(a) version (b) more (c) ☒ protocol (d) flow
7. The protocols used to determine who goes next on a multiaccess channel belong to a sublayer of the data link layer called the _____.
(a) LLC (b) ☒ MAC (c) CSMA (d) SDLC

8. A new MPLS header had to be added in front of the IP header. On a router-to-router line using PPP as the framing protocol, the frame format, is as following sequence: _____.
(a) MPLS, IP, PPP (b) PPP, IP, MPLS (c) **V PPP, MPLS, IP** (d) PPP,IP,TCP,MPLS
9. IP addresses 191.1.2.3 is class _____ format.
(a) A (b) **V B** (c) C (d) D
10. The operation of the Internet is monitored closely by the routers. When something unexpected occurs, the event is reported by the _____.
(a) ARP (b) RARP (c) **V ICMP** (d) BOOTP
11. The original Internet interior gateway protocol was a distance vector protocol. That successor, called OSPF, became a standard in 1990, is a _____ protocol.
(a) **V link state** (b) broadcast (c) distance vector (d) Ad Hoc
12. Port numbers below _____ are called well-known ports and are reserved for standard services.
(a) 256 (b) **V 1024** (c) 4096 (d) 1000
13. The Internet protocol suite supports a connectionless transport protocol, _____.
(a) IP (b) TCP (c) **V UDP** (d) RTP
14. URL(Uniform Resource Locator) have three parts: the _____, the DNS name of the machine on which the page is located, and a local name uniquely indicating the specific page.
(a) **V protocol** (b) address (c) port number (d) name
15. When a client requests a web page, the server can supply additional information along with the requested page. This information may include a _____, which is a small (at most 4KB) file (or string).
(a) **V cookie** (b) water (c) car (d) book
16. HTTP1.1, which supports _____ connections. With them, it is possible to establish a TCP connection, send a request and get a response, and then additional requests and get additional response.
(a) one time (b) **V persistent** (c) stop and wait (d) one-way
17. Various schemes have been devised for digital signatures, using both symmetric-key and _____-key algorithms.
(a) **V public** (b) private (c) one time (d) one way
18. Often, authentication is needed but secrecy is not, based on the idea of a one-way hash function that takes an arbitrarily long piece of plaintext and from it computes a fixed-length bit string. This hash function, MD, often called a _____.
(a) **V message digest** (b) packet-switched (c) message-detect (d) mini data
19. _____, which are overlay networks on top of public networks but with most of the properties of private network..
(a) PBX (b) **V VPN** (c) CDMA 1X (d) GPRS
20. The positioning of SSL is between the application layer and the transport layer, accepting requests from the browser and sending them down to TCP for transmission to the server. Once the secure connection has been established, SSL's

main job is handling compression and encryption. When HTTP is used over SSL, it is called _____.

- (a) HTTP (b) SSL (c) SHTTP (d) **V HTTPS**

21. The range of frequencies transmitted without being strongly attenuated is called the _____.

- (a) baud (b) bps (c) **V bandwidth** (d) signal

22. The two-wire connections between each subscriber's telephone and the end office are known in the trade as the _____.

- (a) trunk (b) **V local loop** (c) link (d) switch

23. _____-based flow control, the protocol has a built-in mechanism that limits the rate at which senders may transmit data, without using feedback from the receiver.

- (a) ACK (b) **V rate** (c) feedback (d) NAK

24. _____, when it is used, a bad frame that is received is discarded, but the good frames received after it are buffered.

- (a) **V selective repeat** (b) go back N (c) sliding window (d) stop and wait

25. The problem of running out of IP addresses is not a theoretical problem that might occur at some point in the distant future. Some people felt that a quick fix was needed for the short term. This quick fix came in the form of _____.

- (a) IP6 (b) DHCP (c) RARP (d) **V NAT**

26. In the simplest form, web pages are _____, that is, are just files sitting on some server waiting to be retrieved.

- (a) variable (b) active (c) dynamic (d) **V static**

27. A large amount of content of page is _____ generated, using server-side scripts, as well as client-side scripts.

- (a) variable (b) active (c) **V dynamic** (d) static

28. Four primary parameters: reliability, delay, jitter, and bandwidth, together these determine the _____.

- (a) performance of service (b) usage of service (c) **V quality of service** (d) price of service

29. Public-key algorithms have the property that _____ keys are used for encryption and decryption and that the decryption key cannot be derived from the encryption key. These properties make it possible to publish the public key.

- (a) one time (b) random (c) same (d) **V different**

30. 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) **V RSA**

III. Please fill in the following blanks (28x1 points).

1. Instant messaging _____ allows two people to type messages at each other in real time. A multiperson version of this idea is the chat room, in which a group of people can type message for all to see.
2. B2C, full name is Business-to-consumer.
3. There are two types of transmission technology that are in widespread use. They are as following: 1. Broadcast link, 2. Point-to-point link. 任意顺序
4. A list of protocol used by a certain system, one protocol per layer, is called a protocol stack ____
5. Error _____ control is an important issue because physical communication circuits are not perfect.
6. An issue that occurs at every level is how to keep a fast sender from swamping a slow received with data. This subject is called flow _____ control
7. These multiplexing schemes can be divided into two basic categories: FDM (Frequency Division Multiplexing) and TDM (Time _____ Division Multiplexing).
8. We will look at four methods to make the start and end of each frame:
 - (b) Character count
 - (c) Flag bytes with byte stuffing
 - (d) Starting and ending flags, with bit stuffing 关键是指出面向位
 - (e) Physical layer coding violations.
9. The polynomial code is also known as a CRC 或 cyclic redundancy check.
10. The technique of temporarily delaying outgoing acknowledgements so that they can be hooked onto the next outgoing data frame is known as piggybacking _____.
11. The essence of all sliding _____ windows protocol is that at any instant of time, the sender maintains a set of sequence numbers corresponding to frames it is permitted to send. These frames are said to fall within the sending _____ window. Similarly, the receiver also maintains a receiving _____ window corresponding to the set of frames it is permitted to accept.
12. HDLC protocol use the frame format included fields flag, address, control _____, data and checksum
13. MACA. The basic idea behind it is for the sender to stimulate the receiver into outputting a short frame, so stations nearby can detect this transmission and avoid transmitting for the duration of the upcoming (large) data frame. Let us now consider how A sends a frame to B. A start by sending an RTS _____ frame to B. This short frame contains the length of the data frame than will eventually follow. Then B replies with a CTS frame. Upon receipt of the CTS frame, A begins transmission.
14. Ethernet, the algorithm, called binary exponential backoff, _____, was chosen to dynamically adapt to the number of stations trying to send .
15. Using virtual circuits requires a setup _____ phase. Datagram subnet is not needed.
 - (a) error control (b) flow control (c) setup (d) transmission
16. Distance vector routing _____ algorithms operate by having each

router maintain a table giving the best known distance to each destination and which line to use to get there. These tables are updated by exchanging information with the neighbors.

17. The idea behind link state routing is simple and can be stated as five parts. Each router must do the following:
 - (f) Discover its neighbors and learn their network address.
 - (g) Measure the delay or cost to each of its neighbors.
 - (h) Construct a packet telling all it has just learned.
 - (i) Send this packet to all other routers.
 - (j) Compute the shortest path to every other router.
18. Handling the general case of making two different networks interwork is exceedingly difficult. However, there is a common special case that is manageable. This case is where the source and destination hosts are on the same type of network, but there is a different network in between. The solution to this problem is a technique called tunneling.
19. Connections are established in TCP by means of the three-way handshake.
20. Naming in the Internet uses a hierarchical scheme called the domain name system 或 DNS.
21. Encryption methods have historically been divided into two categories: substitution ciphers and transposition ciphers 任意顺序
22. The fundamental job of a certificate is to bind a public key to the name of a principal (individual, company, etc.).
23. Each packet filter is a standard router equipped with some extra functionality. The extra functionality allows every incoming or outgoing packet to be inspected. Packets meeting some criterion are forwarded normally. Those that fail the test are dropped.
24. Authentication is the technique by which a process verifies that its communication partner is who it is supposed to be and not an imposter.

IV. Please answer the following questions.

1. (10 points) Please discuss and compare the OSI reference model and the TCP/IP reference model.

PH concerned with transmitting raw bits/deal with mechanical,electrical.timing interface

DL to transform a raw transmission facility into a line that appears free of undetected transmission errors to the network layer/framing/flow control

N routing/internetwork

T accept data from above, pass these to the network layer, and ensure that all arrive correctly at the other end./determines what type of service to provide to the users of the network./a true end-to-end layer

S <EMPTY>

P <EMPTY>

A contains a variety of protocols that are commonly needed by users

COMMON

Based on the concept of a stack of independent protocol

The functionality of the layers is roughly similar

DIFFERENCE

OSI services, interface, protocols

In the area of connectionless versus connection-oriented

2. (12 points) Consider the graph below, each host has been assigned a IP address.
Router A, B, C are used to link the hosts, and the subnet mask is 255.255.255.0.

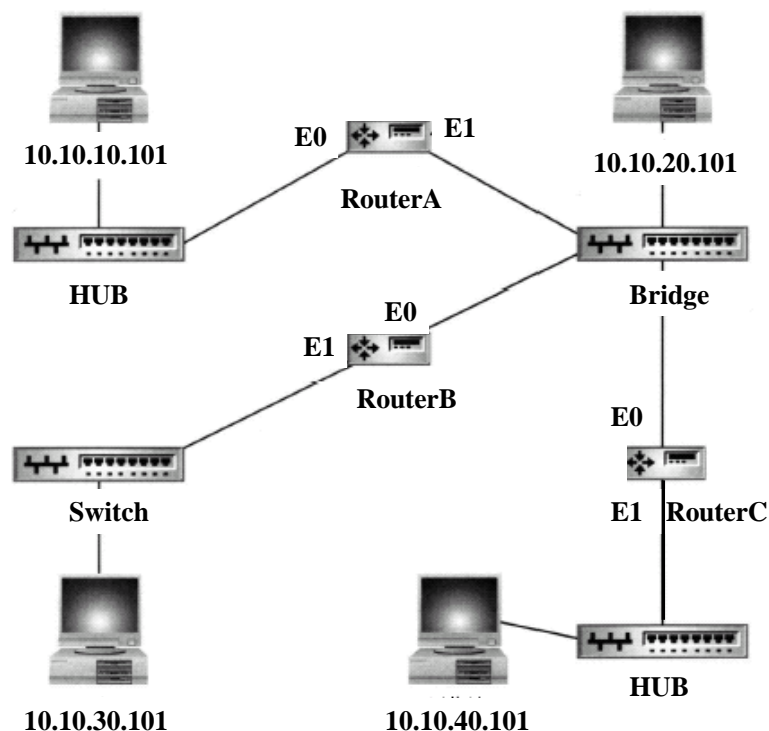
We use CISCO IOS command to configure the three router, the command syntax is:

Configure IP address command:

ip address <ip_address> <subnet_mask>

Configure IP static routing command:

ip route <dest_network> <subnet_mask> <router_address>



Please fill the following blank:

1. Assign IP address to the Ethernet Interface of the three route A, B, C:

Router A:

Interface Ethernet0

Ip address 10.10.10.X 255.255.255.0

Interface Ethernet1

Router B:

Ip address	<u>10.10.20.X</u>	<u>255.255.255.0</u>
Interface Ethernet0		
Ip address	<u>10.10.20.X</u>	<u>255.255.255.0</u>
Interface Ethernet1		
Ip address	<u>10.10.30.X</u>	<u>255.255.255.0</u>

Router C:

Interface Ethernet0		
Ip address	<u>10.10.20.X</u>	<u>255.255.255.0</u>
Interface Ethernet1		
Ip address	<u>10.10.40.X</u>	<u>255.255.255.0</u>

2. Configure the static route of the three router: 直连不管

Router A:

IP route	<u>10.10.30.0</u>	<u>255.255.255.0</u>	<u>10.10.20.X</u>
IP route	<u>10.10.40.0</u>	<u>255.255.255.0</u>	<u>10.10.20.X</u>

Router B:

IP route	<u>10.10.10.0</u>	<u>255.255.255.0</u>	<u>10.10.20.X</u>
IP route	<u>10.10.40.0</u>	<u>255.255.255.0</u>	<u>10.10.20.X</u>

Router C:

IP route	<u>10.10.10.0</u>	<u>255.255.255.0</u>	<u>10.10.20.X</u>
IP route	<u>10.10.30.0</u>	<u>255.255.255.0</u>	<u>10.10.20.X</u>

2004~2005 春夏

一、 Please select the best choice for following questions (50 points)

- What is the advantage of using a layered model of networking?
 - Simplified the network
 - For the purpose of standardization
 - Divides the complexity of internetworking into discrete, more easily learned operation subsets
 - D. All of the above**
- What is the name of protocol data unit (PDU) at the network layer of the OSI reference model?
 - Transport
 - Frame
 - C. Packet**
 - Segment
- Which is true when a broadcast is sent out in an Ethernet 802.3 LAN?
 - The broadcast is sent only to the default gateway.
 - The broadcast is sent only to the destination hardware address in the broadcast.
 - C. The broadcast is sent to all devices in the collision domain.**
 - The broadcast is sent to all devices in the broadcast domain.
- Segmentation of a data stream happens at which layer of the OSI model?
 - Physical

B. Data Link

C. Network

D. Transport

5. Which of following international standard defines for Fast Ethernet?

A. IEEE 802.3

B. IEEE 802.3z

C. IEEE 802.3u

D. IEEE 802.3ae

6. What does the Data Link layer use to find hosts on a local network?

A. Logical network addresses

B. Port numbers

C. Hardware addresses

D. Default gateways

7. What were the key reasons the ISO released the OSI model?

A. To allow companies to charge more for their equipment

B. To help vendors create interoperable network devices

C. To help vendors create and sell specialized software and hardware

D. So the IBM mainframe would be replaced with the PC

8. What is used at the Transport layer to stop a receiving host's buffer from overflowing?

A. Segmentation

B. Packets

C. Acknowledgments

D. Flow control

9. When *data* is encapsulated, which is the correct order?

A. Data, frame, packet, segment, bit

B. Segment, data, packet, frame, bit

C. Data, segment, packet, frame, bit

D. Data, segment, frame, packet, bit

10. What does the term "Base" indicate in 100Base-TX?

A. The maximum distance

B. The type of wiring used

C. A LAN switch method using half duplex

D. A signaling method for communication on the network

11. What is the maximum distance of 100Base-T?

A. 100 feet

B. 1000 feet

C. 100 meters

D. 1000 meters

12. Which of the following would describe a transport layer connection that would ensure reliable delivery?

A. Routing

B. Acknowledgments

C. Switching

D. System authentication

13. Which of the following is not considered a reason for LAN congestion?

A. Low bandwidth

B. Too many users in a broadcast domain

C. Broadcast storms

D. Routers

14. Which of the following are two basic types of dynamic routing?

A. Static and default

B. TCP and UDP exchange

C. Distance-vector and link-state

D. None of the above

15. If your LAN network is currently congested and you are using only hubs in your network, what would be the BEST solution to decrease congestion on your network?

A. Cascade your hubs.

B. Replace your hubs with switches.

C. Replace your hubs with routers.

D. Add faster hubs.

16. What technology is used by most switches to resolve topology loops and ensure that data flows properly through a single network path?

A. RIP

B. STP

C. IGRP

D. Store-and-forward

17. Which of the following is one of the characteristics of IP?

A. reliable and connectionless

B. unreliable and connectionless

C. reliable and connection-oriented

D. unreliable and connection-oriented

18. What is the valid host range for subnet 172.16.10.16 (Mask 255.255.255.240)?

A. 172.16.10.20 through 172.16.10.22

B. 172.16.10.16 through 172.16.10.23

C. 172.16.10.17 through 172.16.10.31

D. 172.16.10.17 through 172.16.10.30

19. What range of addresses can be used in the first octet of a Class B network address?

A. 1–126

B. 128–190

C. 128–191

D. 129–192

20. Which of the following is not true?

A. IP is connectionless and provides routing.

B. ARP is used to find an IP address of a host.

C. UDP is connectionless.

D. TCP is connection oriented.

21. Which class of IP address provides a maximum of only 254 host addresses per network ID?
- A. Class A
 - B. Class B
 - C. Class C**
 - D. Class D
22. Which protocol tool use ICMP?
- A. Telnet
 - B. Ping**
 - C. ARP
 - D. FTP
23. Which of the following is an IEEE standard for frame tagging?
- A. 802.1X
 - B. 802.3Z
 - C. 802.1Q
 - D. 802.3U**
24. A client will use _____ to send emails to mail- server.
- A. POP3
 - B. SMTP**
 - C. TELNET
 - D. FTP
25. Which protocol used in PPP allows multiple Network layer protocols to be used during a connection?
- A. LCP
 - B. NCP**
 - C. HDLC
 - D. X.25
26. When too many packets are present in the subnet, performance degrades. What is this situation called?
- A. dead lock
 - B. congestion**
 - C. network fault
 - D. network busy
27. Which language can be used to realize the client-side dynamic web page generation?
- A. CGI
 - B. ASP**
 - C. JavaScript
 - D. PHP
28. The two-wire connections between each subscriber's telephone and the end office are known in the trade as the _____.
- A. trunk
 - B. local loop
 - C. link
 - D. switch**
29. When web page is transmitted over SSL, the protocol used is _____.
- A. HTTP
 - B. SHTTP
 - C. HTTPS**
 - D. SSL

30. Nyquist proved that if an arbitrary signal has been run through a low-pass filter of bandwidth H , the filtered signal can be completely reconstructed by making only _____ (exact) samples per second

A. H B. $0.5H$ C. $2H$ D. $4H$

31. To convert a binary message to an ASCII message in email system, we can use _____ encoding, which break up groups of 24 bits into four 6-bit units, with each unit being sent as a legal ASCII character.

A. base64 B. quoted-printable C. SMTP D. POP3

32. A CRC generator polynomial is $G(x) = X^8 + X^5 + X^2 + 1$. How many bits will the checksum be?

A. 7 B. 8 C. 9 D. 10

33. If the length of sequence is 4 bits, the maximum sending window size should be _____.

A. 13 B. 14 C. 15 D. 16

34. In 802.11, to solve the _____ station problem and the hidden station problem, we can use CSMA/CA protocol. According this protocol, before the station sending a data, it must send RTS frame and wait a CTS frame back.

A. fault B. mobile C. exposed D. wireless

35. If the congestion window size is 20KB, and the receive window size is 30KB, what is the maximum bytes can the TCP entity transmit?

A. 20KB B. 30KB C. 50KB D. 10KB

36. Port numbers below _____ are called well-known ports and are reserved for standard services.

A. 256 B. 1024 C. 4096 D. 1000

37. _____, which are overlay networks on top of public networks but with most of the properties of private network.

A. PBX B. VPN C. CDMA 1X D. GPRS

38. The problem of running out of IP addresses is not a theoretical problem that might occur at some point in the distant future. Some people felt that a quick fix was needed for the short term. This quick fix came in the form of _____.

A. IP6 B. DHCP C. RARP D. NAT

39. Public-key algorithms have the property that _____ keys are used forencryption and decryption and that the decryption key cannot be derived from the encryption key. These properties make it possible to publish the public key.

A. one time B. random C. same D. different

40. 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

41. Various schemes have been devised for digital signatures, using both symmetric-key and _____-key algorithms.

A. public B. private C. one time D. one way

42. Often, authentication is needed but secrecy is not, based on the idea of a one-way hash function that takes an arbitrarily long piece of plaintext and from it computes a fixed-length bit string.

This hash function, MD, often called a _____.

A. message digest B. packet-switched C. message-detect D. mini data

43. URL(Uniform Resource Locator) have three parts: the _____, the DNS name of the machine on which the page is located, and a local name uniquely indicating the specific page.

A. protocol B. address C. port number D. name

44. HTTP1.1, which supports _____ connections. With them, it is possible to establish a TCP connection, send a request and get a response, and then additional requests and get additional response.

A. one time B. persistent C. stop and wait D. one-way

45. _____, when it is used, a bad frame that is received is discarded, but the good frames received after it are buffered.

A. selective repeat B. go back N C. sliding window D. stop and wait

46. How does the FDM multiplexing schemes work like?

A. each user having exclusive possession of some band

B. each user take turns, periodically getting the entire bandwidth for a litter burst of time

C. each user transmit over the entire frequency spectrum all the time with different coding

D. each user transmit over a shared fiber using different wavelength

47. When we use a modem, which use 16 phases signal to modulation, then how much can we get the maximum data rate in a 2400 baud channel (in noiseless channel)?

A. 400bps B. 2400bps C. 9.6kbps D. 14.4kbps

48. _____ 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

49. Which of the following best describes the function of the OSI reference model's transport layer?

A. It sends data by using flow control

B. It provides the best path for delivery

C. It determines network addresses

D. It provides error-correcting

50. What is the most efficient subnet mask to use on point-to-point WAN links?

A. 255.255.255.0 B. 255.255.255.224 C. 255.255.255.252 D. 255.255.255.248

二、 Please choose true (T) or false (F) for the following questions (15 points)

1. Error-correcting and error-detecting are two types of technique in error control. T

2. Link state dynamic routing algorithms operate by having each router maintain a table giving the best known distance to each destination and which line to use to get there. These tables are updated by exchanging information with the neighbors.

3. With Manchester encoding, each bit period is divided into two equal intervals. A

- binary 1 bit is sent by having the voltage set high during the first interval and low in the second one. A binary 0 is just the reverse: first low and then high. **T**
4. A connection is established in TCP by means of the **two-way** handshake. **F**
5. The range of frequencies transmitted without being strongly attenuated is called bandwidth. **T**
6. Shannon's major result is that the maximum data rate of a noisy channel whose bandwidth is H Hz, and whose signal-to-noise ratio is S/N , is given by **Maximum number of baud/sec = $H \log_2(1+S/N)$** **F**
7. Two different switching techniques are widely used nowadays: circuit switching and packet switching. **T**
8. The protocols used to determine who goes next on a multi-access channel belong to a sub-layer of the data link layer called the LLC(**MAC**) sublayer. **F**
9. The basic function of RTP is to multiplex several real-time data streams onto a single stream of UDP packets. **T**
10. The Internet solution is to realize that two potential problems exist network capacity and receiver capacity and to deal with each of them separately. To do so, each sender maintains two windows: the window the receiver has granted and a second window, the congestion window.
11. Selective repeat(**Go back N**), is for the receiver simply to discard all subsequent frames, sending no acknowledgments for the discarded frames. **F**
12. The IPsec is a **set** of open standards that provides data confidentiality, data integrity, and authentication between participating peers at the IP layer. **T**
13. B2C, the full name is Business to Company.
14. One type of person-to-person communication often goes by the name of end-to-end communication, to distinguish it from the client-server model. **F**
15. An issue that occurs at every level is how to keep a fast sender from swamping a slow receiver with data. This subject is called flow control.

三、 Please answer the following questions briefly.

1. What are the principal differences between connectionless communications and connection-oriented communications? (5 points)

答：主要的区别有两条。其一：面向连接通信分为三个阶段，第一是建立连接，在此阶段，发出一个建立连接的请求。只有在连接成功建立之后，才能开始数据传输，这是第二阶段。接着，当数据传输完毕，必须释放连接。而无连接通信没有这么多阶段，它直接进行数据传输。其二：面向连接的通信具有数据的保序性，而无连接的通信不能保证接收数据的顺序与发送数据的顺序一致。

3. Data link protocols almost always put the CRC in a trailer rather than in a header. Why? (5 points)

答：CRC是在发送期间进行计算的。一旦把最后一位数据送上外出线路，就立即把CRC编码附加在输出流的后面发出。如果把CRC放在帧的头部，那么就要在发送之前把整个帧先检查一遍来计算CRC。这样每个字节都要处理两遍，第一遍是为了计算检验码，第二遍是为了发送。把CRC在尾部就可以把处理时间减半。

4. Suppose that the TCP congestion window is set to 18KB and a timeout occurs. How big will the window be if the next four transmission bursts are all successful?

Assume that the maximum size of segment is 1KB. (5 points)

答: The next transmission will be 1 maximum segment size. Then 2, 4, and 8. So after four successes, it will be 8 KB. 超时后进入慢启动, 从最大片段大小开始乘性增: 1 2 4 8, 9 10 11 12直到再次超时。所以4次成功传输突发后, 拥塞窗口是8KB。

四、 A large number of consecutive IP address are available starting at 198.16.0.0. Suppose that four organizations, A, B, C, and D, request 4000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the $w.x.y.z/s$ notation. (8 points) (Notice: To start with, all the requests are rounded up to a power of two.)

答:

To start with, all the requests are rounded up to a power of two. The starting address, ending address, and mask are as follows:

A: 198.16.0.0–198.16.15.255 written as 198.16.0.0/20

B: 198.16.16.0–198.16.23.255 written as 198.16.16.0/21

C: 198.16.32.0–198.16.47.255 written as 198.16.32.0/20

D: 198.16.64.0–198.16.95.255 written as 198.16.64.0/19

五、 The following figure describes a simple authentication protocol. Assume you are Trudy, please use reflection attack to attack Bob.

(1). Draw the attack figure and give clear the steps of the attack

(2). What are the differences between **authentication** and **authorization**? (12 points)

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1–10 C A A C B B D B B C

11–20 D D B B C D A A B C

21–30 C C B D D D A C B C

31–40 C C C A A B B D A C

41–50 B B D A A C D C D B

51–60 D A C A D C D C D D

61–70 D A A D D B B B B B

71–80 C D A A A A D A A A

81–90 B D D C D B C C C B

91–100 C C C A A A C C B A

For each following question, please select your best answer only!!!

1. The transmission unit for the physical layer is a/an _____.

A. packet

B. frame

C. bit

D. byte

2. In the original ARPANET, _____ were directly connected together.

A. IMPs

B. Host computers

C. Networks

- D. NICs
3. The communication subnet consists of _____.
- A. physical layer, data link layer, and network layer
- B. physical layer, network layer, transport layer
- C. physical layer, data link layer, network layer, transport layer
- D. data link layer, network layer, transport layer, session layer
4. Why was the OSI model developed?
- A. Manufacturers disliked the TCP/IP protocol suite.
- B. The rate of data transfer was increasingly exponentially.
- C. Standards were needed to allow any two systems to communicate.
- D. None of the above.
5. As a data packet moves from the lower to the upper layers, headers are _____.
- A. Added
- B. Subtracted
- C. Rearranged
- D. modified
6. Which protocol can connect the computer components together without wires?
- A. 802.11
- B. 802.15
- C. 802.16
- D. None of the above
7. Which does not belong to the OSI model?
- A. Presentation layer
- B. Session layer
- C. Transport layer
- D. Security layer
8. What is the main function of the transport layer?
- A. Node-to-node delivery
- B. Process-to-process message delivery
- C. Synchronization
- D. Updating and maintenance of routing tables.
9. Which of the following is incorrect?
- A. The OSI model is better than the TCP/IP model.
- B. The OSI model provides more efficient implementation than the TCP/IP model.
- C. The OSI model has more layers than the TCP/IP model.
- D. The OSI model makes the distinction between services, interfaces, protocols.
10. The TCP/IP protocol suite has specifications for which layers of the OSI model?
- A. 1 through 3
- B. 1 through 4 and 7
- C. 3, 4, and 5 through 7
- D. 1, 3, and 4
11. Which is a connection-less network?

- A. X.25
- B. Frame Relay
- C. ATM

D. None of the above

12. A noiseless 2-k Hz channel is sampled every 1 msec. What is the maximum data rate?

- A. 1000 bps
- B. 2000 bps
- C. 4000 bps

D. Can be infinite

13. If a binary signal is sent over a 1-k Hz channel whose signal-to-noise ratio is 63:1, what is the maximum achievable data rate?

- A. 1000 bps
- B. 2000 bps
- C. 6000 bps

D. None of the above

14. Which has the lowest error rate?

- A. Coax
- B. Fiber
- C. Microwave
- D. UTP

15. A telephone switch is a kind of _____.

- A. packet-switching
- B. message-switching
- C. circuit-switching
- D. None of the above

16. Which has the highest frequency?

- A. Microwave
- B. AM radio
- C. FM radio
- D. Lightwave

17. Which kind of satellites has the highest altitude?

- A. GEO satellites
- B. MEO satellites
- C. LEO satellites

D. A, B, and C are equal.

18. Which method is not normally used for framing?

- A. Inserting time gaps between frames
- B. Flag bytes with byte stuffing
- C. Starting and ending flags, with bit stuffing
- D. Physical layer coding violations

19. A bit string, 01101111101111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? (Whenever the sender's data link layer encounters five consecutive 1s in the data, it

automatically stuffs a 0 bit into the outgoing bit stream)

A. 01101111101111110

B. 0110111110011111010

C. 011011111011111010

D. None of the above

20. Given a code with only four valid codewords: 0000000000, 0000011111, 1111100000, 1111111111, how many errors can be corrected?

A. 5

B. 3

C. 2

D. 1

21. Which is correct?

A. The Polynomial code is used to detect errors.

B. The Hamming code is to correct errors.

C. Both A and B.

D. Neither A or B.

22. The maximum number of outstanding sending frames for a go back n protocol is _____. (Assume the sequence number has 3 bits)

A. 1

B. 4

C. 7

D. 8

23. The maximum number of outstanding sending frames for a selective repeat protocol is _____. (Assume the sequence number has 3 bits)

A. 1

B. 4

C. 7

D. 8

24. Which is not derived from SDLC?

A. HDLC

B. LAP

C. LAPB

D. 802.3

25. What is the purpose of LCP?

A. Establishment of a link

B. Maintenance of a link

C. Termination of a link

D. All of the above

26. What features does PPP provide?

A. A framing method

B. LCP

C. NCP

D. All of the above

27. Which of the following protocols would have the highest channel

utilization?

A. 0.5-persistent CSMA

B. 1-persistent CSMA

C. Pure ALOHA

D. Slotted ALOHA

28. Which is/are used for collision-free protocols?

A. Bit-map

B. Binary countdown

C. Both A and B

D. Neither A or B

29. The data and the pad within a single classical Ethernet frame should be no less than _____ bytes.

A. 64

B. 46

C. 32

D. 16

30. After _____ continuous collisions, the Ethernet controller gives up and reports failure back to the computer.

A. 4

B. 8

C. 16

D. 32

31. 10BASE2 uses _____ cables while 10BASE5 uses _____ cables.

A. Thick coaxial, thin coaxial

B. Twisted-pair, thick coaxial

C. Thin coaxial, thick coaxial

D. Fiber-optic, thin coaxial

32. Which uses optical cables?

A. 10Base5.

B. 10Base2.

C. 10Base-F.

D. 10Base-T.

33. Fast Ethernet supports up to what transfer rate?

A. 5 Mbps

B. 10 Mbps

C. 100 Mbps

D. 1000 Mbps

34. Which device works at the physical layer?

A. Hub

B. Bridge

C. Router

D. Gateway

35. Which is more successful?

A. 802.3

- B. 802.4
 - C. 802.5
 - D. None of them
36. Which routing has the count-to-infinity problem?
- A. Flooding
 - B. Distance vector routing
 - C. Link state routing
 - D. Hierarchical routing
37. Which routing is most suitable for applications like Internet TV?
- A. Unicast routing
 - B. Multicast routing
 - C. Broadcast routing
 - D. They are equal.
38. Which is incorrect?
- A. VC subnet requires circuit setup.
 - B. VC subnet can guarantee QoS easily.
 - C. VC subnet can avoid congestion problem easily.
 - D. VC subnet can handle router failure easily.
39. Which is incorrect?
- A. OSPF uses distance vector routing.
 - B. RIP uses distance vector routing.
 - C. BGP uses distance vector routing.
 - D. None of the above.
40. Which is the protocol for routing between autonomous systems?
- A. OSPF
 - B. AGP
 - C. BGP
 - D. PPP
41. In _____ routing, the destination address is a network address in the routing table.
- A. Next-hop
 - B. Network-specific
 - C. Host-specific
 - D. default
42. _____ is a dynamic mapping protocol in which a logical address is found for a given physical address.
- A. ARP
 - B. RARP
 - C. ICMP
 - D. None of the above
43. Which field or bit value unambiguously identifies the datagram as a fragment?
- A. Identification = 1000

- B. Do not fragment bit = 0
 - C. More fragment bit = 0
 - D. Fragment offset = 1000
44. The checksum in the IP packet covers _____.
- A. Just the header
 - B. Just the data
 - C. The header and the data
 - D. Just the source and destination addresses
45. Identify the class of the following IP address: 4.5.6.7.
- A. Class A
 - B. Class B
 - C. Class C
 - D. Class D
46. Identify the following IP address: 169.5.0.0.
- A. Host IP address
 - B. Broadcast address
 - C. Network address
 - D. None of the above
47. The loopback address is used to send a packet from the _____ to _____.
- A. Host; all other hosts
 - B. Router; all other hosts
 - C. Host; a specific host
 - D. Host; itself
48. Which of the following statements about IPv4 header fields is incorrect?
- A. An address has 32 bits.
 - B. The TTL has 8 bits.
 - C. The version has 8 bits.
 - D. The identification has 16 bits.
49. Which of the following statements about IPv4 header fields is incorrect?
- A. The IHL has 4 bits.
 - B. The total length has 16 bits.
 - C. The checksum is used to check the header only.
 - D. None of them
50. The subnet mask for a network is 255.255.255.192. How many hosts are available?
(Disregard special addresses)
- A. 254
 - B. 62
 - C. 4
 - D. None of the above
51. A supernet mask is 255.255.248.0. How many class C networks were combined to make this supernet?
- A. 2

- B. 4
- C. 6
- D. 8

52. What is the minimum number of bits that can be borrowed to form a subnet?
(According to the latest RFC standards)

- A. 1
- B. 2
- C. 4
- D. None of the above

53. A subnet mask in class A has 14 1s. How many subnets does it define?

- A. 8
- B. 32
- C. 64
- D. 128

54. Which of the following can NOT be used to traffic shaping?

- A. Overprovisioning
- B. Leaky bucket algorithm
- C. Token bucket algorithm
- D. Packet scheduling

55. Which can be used to describe the requirement for a network flow?

- A. Reliability
- B. Delay
- C. Bandwidth
- D. All of the above

56. UDP is an acronym for _____.

- A. User Delivery Protocol
- B. User Datagram Procedure
- C. User Datagram Protocol
- D. Unreliable Datagram Protocol

57. 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

58. In the sending computer, UDP receives a data unit from the _____ layer, and then sends it to the _____ layer.

- A. application; application
- B. transport; transport
- C. application; network
- D. network; application

59. The TCP/IP application layer corresponds to the OSI model's _____ layers.

- A. Physical, data link, and network
- B. Transport and network

C. Session and transport

D. Session, presentation, and application

60. The _____ address uniquely identifies a running application program.

A. IP address

B. Host

C. NIC

D. socket

61. Which range of port numbers is unregulated?

A. Below 255

B. Between 256 and 512

C. Between 256 and 1023

D. Above 1023

62. Urgent data requires the urgent pointer field as well as the URG bit in the _____ field.

A. Control

B. Offset

C. Sequence number

D. reserved

63. 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. Both A and B

D. Neither A or B

64. TCP connection establishment involves a _____ handshake; connection termination involves a _____ handshake.

A. One-way; two-way

B. Two-way; three-way

C. Three-way; three-way

D. Three-way; four-way

65. The _____ timer is used in the termination phase.

A. Retransmission

B. Persistence

C. Keepalive

D. Timer-waited

66. The _____ timer is needed to handle the zero window-sized advertisement.

A. Retransmission

B. Persistence

C. Keepalive

D. Time-waited

67. The TCP uses _____ to establish a connection.

A. two-way handshake

B. three-way handshake

- C. four-way handshake
 - D. none of the above
68. The server program is _____ because it is always available, waiting for a client request.
- A. active
 - B. passive
 - C. finite
 - D. infinite
69. Which DNS type field means the IP address of a host?
- A. TXT
 - B. A
 - C. HINFO
 - D. CNAME
70. In the mail address `dxh@cs.zju.edu.cn`, what is the domain name?
- A. dxh
 - B. cs.zju.edu.cn
 - C. dxh@cs.zju.edu.cn
 - D. A and B
71. The purpose of the message transfer agent is _____.
- A. message preparation
 - B. envelope creation
 - C. transferal of messages across the Internet
 - D. A and B
72. Which is not able to generate dynamic contents at the server?
- A. CGI
 - B. JSP
 - C. ASP
 - D. JavaScript
73. An ending tag (of Web documents) is usually of the form _____.
- A. `</tagname>`
 - B. `<\tagname>`
 - C. `<tagname>`
 - D. `<tagname!>`
74. Which HTML tag is used for a sequential list?
- A. `ol`
 - B. `ul`
 - C. `br`
 - D. None of the above
75. Which is not true for HTTP?
- A. HTTP 1.0 supports persistent connections.
 - B. HTTP's default port is 80.
 - C. HTTP is an acronym of HyperText Transfer Protocol.
 - D. None of the above.
76. Encryption/decryption provides a network with _____.

A. secrecy

B. Authentication

C. Integrity

D. Nonrepudiation

77. Which encryption algorithm is most difficult to decipher?

A. DES

B. AES

C. RSA

D. One-time pad

78. In public-key encryption, the public key is used for _____, while the private key is used for _____.

A. Encryption; decryption

B. Encryption; encryption

C. Decryption; encryption

D. Decryption; decryption

79. In digital signature technique, the sender of the message uses _____ to create ciphertext.

A. Her own private key

B. Her own public key

C. The receiver's private key

D. The receiver's public key

80. Which certifies the binding between a public key and its owner?

A. CA

B. KDC

C. TLS

D. Firewall

81. Which is a trusted third party that solves the problem of secret-key distribution?

A. CA

B. KDC

C. TLS

D. Firewall

82. A method to provide for the secure transmission of email is called _____.

A. RSA

B. DES

C. BVD

D. PGP

83. Which can improve the performance of a Web server?

A. RAID disks

B. A multithreaded Web server

C. A server farm

D. All of the above

84. Which is not directly contained in an URL?

- A. How the page is accessed
 - B. Where the page is located
 - C. How the page is generated (such as JSP, ASP, CGI etc)
 - D. What the page is called.
85. Which is not true of a cookie?
- A. A cookie can be non-persistent.
 - B. A cookie can be persistent.
 - C. A cookie makes the web stateful.
 - D. A cookie makes the web stateless.
86. Which is the best symmetric-key encryption algorithm?
- A. DES
 - B. AES
 - C. Substitution
 - D. Transposition
87. What is/are the fundamental cryptographic principle(s)?
- A. Redundancy
 - B. Freshness
 - C. Both A and B
 - D. Neither A or B
88. If an encryption algorithm is unbreakable against _____, then it is good.
- A. Ciphertext-only attack
 - B. Known plaintext attack
 - C. Chosen plaintext attack
 - D. A, B, and C are just equal.
89. Which is more suitable for byte-by-byte encryption?
- A. Electronic code book mode
 - B. Cipher block chaining mode
 - C. Cipher feedback mode
 - D. Stream cipher mode
90. Which system call attaches a local address to a socket?
- A. socket
 - B. bind
 - C. listen
 - D. accept
91. Which tool can be used to analyze the fields of a network protocol?
- A. netstat
 - B. ping
 - C. ethereal
 - D. tracert
92. Which of the following can be used to display TCP connections?
- A. ping
 - B. tracert
 - C. netstat

D. telnet

93. Which of the following system calls is to specify queue size for a server socket?

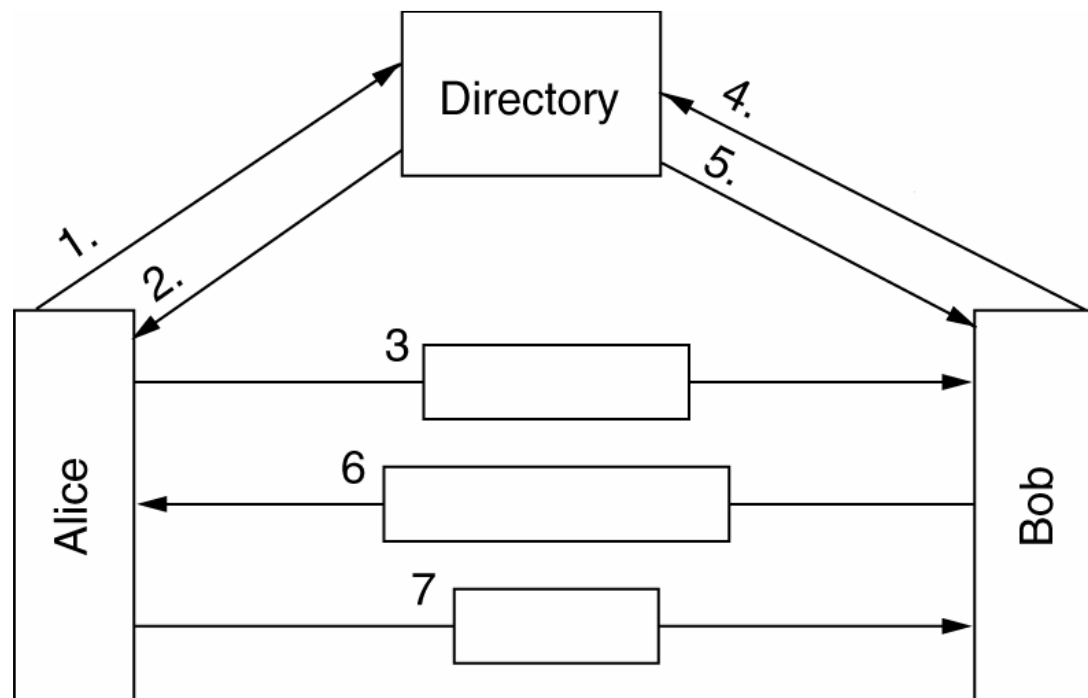
A. bind

B. size

C. listen

D. accept

The following diagram is used to perform mutual authentication by using pub-key cryptography, please answer the following 7 questions. (where E_x means use x 's key to encrypt something, and R_x means a random number from x)



94. Which should be used for blank (1)?

A. Give me the public-key for Bob

B. Give me the private-key for Bob

C. Give me the public-key for Alice

D. Give me the private-key for Alice

95. Which should be used for blank (2)?

A. Here is the public-key for Bob

B. Here is the private-key for Bob

C. Here is the public-key for Alice

D. Here is the private-key for Alice

96. Which should be used for blank (3)?

A. $E_b(A, R_a)$

B. $E_a(A, R_a)$

C. $E_b(B, R_a)$

D. $E_a(B, R_a)$

97. Which should be used for blank (4)?

A. Give me the public-key for Bob

- B. Give me the private-key for Bob
 - C. Give me the public-key for Alice
 - D. Give me the private-key for Alice
98. Which should be used for blank (5)?
- A. Here is the public-key for Bob
 - B. Here is the private-key for Bob
 - C. Here is the public-key for Alice
 - D. Here is the private-key for Alice
99. Which should be used for blank (6)?
- A. $E_b(R_a, R_b, K_s)$
 - B. $E_a(R_a, R_b, K_s)$
 - C. $E_b(R_a, R_b, K_b)$
 - D. $E_a(R_a, R_b, K_a)$
100. Which should be used for blank (7)?
- A. $K_s(R_b)$
 - B. $E_a(R_b)$
 - C. $E_b(R_b)$
 - D. None of the above

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1. The transmission unit for the physical layer is a/an _____.
 - A.) packet
 - B.) frame
 - C.) bit
 - D.) byte

2. Which best describes the structure of an encapsulated data packet?
 - A.) Segment header, network header, data, frame trailer
 - B.) Segment header, network header, data, segment trailer
 - C.) Frame header, network header, data, frame trailer
 - D.) Frame header, segment header, data, segment trailer

3. The communication subnet consists of _____.
 - A.) physical layer, data link layer, and network layer
 - B.) physical layer, network layer, transport layer
 - C.) physical layer, data link layer, network layer, transport layer
 - D.) data link layer, network layer, transport layer, session layer

4. Which of the following statements best describes a WAN?
 - A.) It connects LANs that are separated by a large geographic area.
 - B.) It connects workstations, terminals, and other devices in a metropolitan area.
 - C.) It connects LANs within a large building.
 - D.) It connects workstations, terminals, and other devices within a building.

5. Which is the movement of data through layers?
 - A.) Wrapping
 - B.) Encapsulation
 - C.) Traveling
 - D.) Transmission
6. Which is the OSI model?
 - A.) A conceptual framework that specifies how information travels through networks.
 - B.) A model that describes how data make its way from one application program to another throughout a network.
 - C.) A conceptual framework that specifies which network functions occur at each layer
 - D.) All of the above
7. Which of the OSI layers divides the transmitted bit stream into frames?
 - A.) Physical layer
 - B.) Data link layer
 - C.) Network layer
 - D.) Transport layer
8. Which of the following is **incorrect**?
 - A.) The OSI model is better the TCP/IP model.
 - B.) The OSI model provides more efficient implementation than the TCP/IP model.
 - C.) The OSI model has more layers than the TCP/IP model.
 - D.) The OSI model makes the distinction between services, interfaces, protocols.
9. In the TCP/IP model, which layer deals with reliability, flow control, and error correction?
 - A.) Application
 - B.) Transport
 - C.) Internet
 - D.) Network access
10. The TCP/IP protocol suite has specifications for which layers of the OSI model?
 - A.) 1 through 3
 - B.) 1 through 4 and 7
 - C.) 3, 4, and 5 through 7
 - D.) 1, 3, and 4

11. A noiseless 4-k Hz channel is sampled every 1 msec. What is the maximum data rate?
- A.) 8000 bps
 - B.) 4000 bps
 - C.) 1000 bps
 - D.) Can be infinite
12. If a binary signal is sent over a 4-k Hz channel, what is the maximum achievable data rate?
- A.) 8000 bps
 - B.) 4000 bps
 - C.) 1000 bps
 - D.) Can be infinite
13. If a binary signal is sent over a 4-k Hz channel whose signal-to-noise ratio is 127:1, what is the maximum achievable data rate?
- A.) 28000 bps
 - B.) 8000 bps
 - C.) 4000 bps
 - D.) Can be infinite
14. A modem constellation diagram has data points at the following coordinates: (1, 1), (1, -1), (-1, 1), and (-1, -1). How many bps can a modem with these parameters achieve at 1200 baud?
- A.) 1200 bps
 - B.) 2400 bps
 - C.) 4800 bps
 - D.) None of the above
15. What is WDM?
- A.) Multiplexing on fiber-optic cable.
 - B.) Multiplexing using the density of the transmission media.
 - C.) A form of flow control that monitors WAN delays.
 - D.) A form of congestion management for WANs.
16. Which technology is not a type of wireless communication?
- A.) Cellular
 - B.) Broadband
 - C.) Infrared
 - D.) Spread spectrum
17. What is one advantage of using fiber optic cable in networks?
- A.) It is inexpensive.
 - B.) It is easy to install.

- C.) It is an industry standard and is available at any electronics store
- D.) It is capable of higher data rates than either coaxial or twisted-pair cable.

18. A telephone switch is a kind of _____.
- A.) packet-switching
 - B.) buffer-switching
 - C.) fabric-switching
 - D.) circuit-switching.
19. A cable TV system has 100 commercial channels, all of them alternating programs with advertising. This kind of multiplexing uses _____.
- A.) TDM
 - B.) FDM
 - C.) FDM + TDM
 - D.) None of the above.
20. A bit string, 0110111110111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing (Whenever the sender's data link layer encounters five consecutive 1s in the data, it automatically stuffs a 0 bit into the outgoing bit stream)
- A.) 01101111101111110
 - B.) 0110111110011111010
 - C.) 011011111011111010
 - D.) None of the above
21. When DCF (Distributed Coordination Function) is employed, 802.11 uses a protocol called _____.
- A.) CSMA/CA
 - B.) CSMA/CD
 - C.) ALOHA
 - D.) WDMA
22. Which of the following can NOT directly be used for framing?
- A.) Character count.
 - B.) Flag bytes with byte stuffing.
 - C.) Starting and ending flags, with bit stuffing.
 - D.) Physical layer coding violations.
23. Which of the following can a VLAN be considered?
- A.) Broadcast domain
 - B.) Collision domain
 - C.) Both a broadcast and a collision domain
 - D.) Domain name

24. What is the purpose of Spanning Tree Protocol? (Network Bridging)
- A.) To maintain single loop paths
 - B.) To maintain a loop-free network
 - C.) To maintain a multiloop network
 - D.) To maintain a reduced loop network
25. Which uses the twisted pairs?
- A.) 10Base5.
 - B.) 10Base2.
 - C.) 10Base-F.
 - D.) 10Base-T.
26. How do switches learn the addresses of devices that are attached to their ports?
- A.) Switches get the tables from a router.
 - B.) Switches read the source address of a packet that is entering through a port.
 - C.) Switches exchange address tables with other switches.
 - D.) Switches are not capable of building address tables.
27. Repeaters can provide a simple solution for what problem?
- A.) Too many types of incompatible equipment on the network
 - B.) Too much traffic on a network
 - C.) Too-slow convergence rates
 - D.) Too much distance between nodes or not enough cable.
28. Which of the following is true of a switch' s function?
- A.) Switches increase the size of a collision domains.
 - B.) Switches combine the connectivity of a hub with the capability to filter or flood traffic based on the destination MAC address of the frame.
 - C.) Switches combine the connectivity of a hub with the traffic direction of a router.
 - D.) Switches perform Layer 4 path selection.
29. Ethernet MAC addresses are how many bits in length?
- A.) 12
 - B.) 24
 - C.) 48
 - D.) 64
30. What is the information that is “burned in ” to a network interface card?
- A.) NIC
 - B.) MAC address

- C.) Hub
 - D.) LAN
31. Which connector does UTP (Unshield Twisted Pair) use?
- A.) STP
 - B.) RJ-45
 - C.) RJ-69
 - D.) BNC
32. Using repeaters does which of the following to the collision domain?
- A.) Reduces
 - B.) Has no effect on
 - C.) Extends
 - D.) None of the above
33. Which of the following is *not* a feature of microsegmentation?
- A.) It enables dedicated access.
 - B.) It supports multiple conversions at any given time.
 - C.) It increases the capacity for each workstation connected to the network.
 - D.) It increases collisions.
34. Which of the following protocols would have the highest channel utilization?
- A.) 0.5-persistent CSMA
 - B.) 1-persistent CSMA
 - C.) Pure ALOHA
 - D.) Slotted ALOHA
35. Which of the following is true concerning a bridge and its forwarding decisions?
- A.) Bridges operate at OSI Layer 2 and use IP addresses to make decisions.
 - B.) Bridges operate at OSI Layer 3 and use IP addresses to make decisions.
 - C.) Bridges operate at OSI Layer 2 and use MAC addresses to make decisions.
 - D.) Bridges operate at OSI Layer 3 and use MAC addresses to make decisions.
36. Fast Ethernet supports up to what transfer rate?
- A.) 5 Mbps
 - B.) 10 Mbps
 - C.) 100 Mbps
 - D.) 1000 Mbps
37. Media Access Control refers to what?
- A.) The state in which a NIC has captured the networking medium and is ready to transmit

- B.) Rules that govern media capture and release
 - C.) Rules that determine which computer on a shared-medium environment is allowed to transmit the data
 - D.) A formal byte sequence that has been transmitted.
38. Which best describes a CSMA/CD network?
- A.) One node's transmission traverses the entire network and is received and examined by every node.
 - B.) Signals are sent directly to the destination if the source knows both the MAC and IP addresses
 - C.) One node's transmission goes to the nearest router, which sends it directly to the destination.
 - D.) Signals always are sent in broadcast mode.
39. Which of the following statements about IPv4 header fields is incorrect?
- A.) An address has 32 bits.
 - B.) The TTL has 4 bits.
 - C.) The version has 4 bits.
 - D.) The identification has 16 bits.
40. The subnet mask for a class B network is 255.255.255.192. How many subnetworks are available? (Disregard special addresses)
- A.) 2
 - B.) 4
 - C.) 1024
 - D.) 192
41. Which of the following can be used to connect a keyboard with a computer?
- A.) 802.3
 - B.) 802.11
 - C.) 802.15
 - D.) 802.16
42. Which of the following can be used as the wireless local loop for public switched telephone systems?
- A.) 802.3
 - B.) 802.11
 - C.) 802.15
 - D.) 802.16
43. What is the IP address of the internal loopback?
- A.) 10.10.10.1
 - B.) 255.255.255.0
 - C.) 127.0.0.1

- D.) 192.0.0.1
44. How does the network layer forward packets from the source to the destination?
- A.) By using an IP routing table
 - B.) By using ARP responses
 - C.) By referring to a name server
 - D.) By referring to the bridge
45. What is one advantage of dynamic routing?
- A.) Takes little network overhead and reduces network traffic
 - B.) Reduces unauthorized break-ins because security is tight
 - C.) Adjusts automatically to topology or traffic changes
 - D.) Requires little bandwidth to operate efficiently
46. Which best describes a default route?
- A.) Urgent-data route manually entered by a network administrator
 - B.) Route used when part of the network fails
 - C.) Route used when the destination network is not listed explicitly in the routing table
 - D.) Preset shortest path
47. What does ICMP stand for?
- A.) Internal Control Message Portal
 - B.) Internal Control Message Protocol
 - C.) Internet Control Message Portal
 - D.) Internet Control Message Protocol
 - E.)
48. What does TTL stand for? (For IP Header fields)
- A.) Time-To-List
 - B.) Time-To-Live
 - C.) Terminal-To-List
 - D.) Terminal-To-Live
49. What is one advantage of distance vector algorithms?
- A.) They are not likely to count to infinity.
 - B.) You can implement them easily on very large networks.
 - C.) They are not prone to routing loops.
 - D.) They are computationally simple
50. Which of the following best describes a link-state algorithm?
- A.) It recreates the topology of the entire internetwork.
 - B.) It requires numerous computations.
 - C.) It determines distance and direction to any link on the internetwork.

- D.) It uses litter network overhead and reduces overall traffic.
51. What is the minimum number of bits that can be borrowed to form a subnet?
A.) 1
B.) 2
C.) 4
D.) None of the above
52. In order to find out its IP address, a machine can use _____.
A.) ARP
B.) RARP
C.) ICMP
D.) UDP
53. Which portion of the Class B address 154.19.2.7 is the network address?
A.) 154
B.) 154.19
C.) 154.19.2
D.) 154.19.2.7
54. How many host addresses can be used in a Class C network?
A.) 253
B.) 254
C.) 255
D.) 256
55. Which of the following can NOT be used to traffic shaping?
A.) Overprovisioning
B.) Leaky bucket algorithm
C.) Token bucket algorithm
D.) Packet scheduling
56. When the congestion is **very** seriously, which kind of control should be used?
A.) Warning bits
B.) Load shedding
C.) Chocke packets
D.) Hop-by-hop chope packets
57. Which of the following is most appropriate in order to make the full use of IP addresses?
A.) Subneting
B.) CIDR
C.) NAT

D.) All of the above

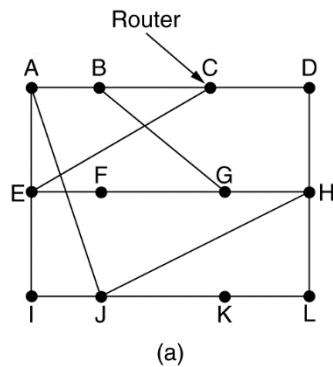
58. How many bits does an IPv6 address have?

- A.) 32
- B.) 64
- C.) 128
- D.) 256

59. Which of the following is true for distance vector routing?

- A.) Useful for nothing.
- B.) Used in OSPF
- C.) Used in BGP
- D.) None of the above

Given the subnet shown in (a) and the incomplete routing table shown in (b), please use distance vector routing to answer the next 4 questions.



To	A	I	H	K	New estimated delay from J	
A	0	24	20	21	8	A
B	12	36	31	28	20	A
C	25	18	19	36		
D	40	27	8	24	20	H
E	14	7	30	22	17	I
F	23	20	19	40		
G	18	31	6	31	18	H
H	17	20	0	19		
I	21	0	14	22	10	I
J	9	11	7	10	0	—
K	24	22	22	0	6	K
L	29	33	9	9		
<div> <div>JA delay is 8</div> <div>JL delay is 10</div> <div>JH delay is 12</div> <div>JK delay is 6</div> </div>					New routing table for J	
Vectors received from J's four neighbors						

(b)

60. What is the new distance and next hop for going to C?

- A.) 28, I
- B.) 28, A
- C.) 12, I
- D.) 12, G

61. What is the new distance and next hop for going to F?

- A.) 30, H
- B.) 30, I
- C.) 18, A
- D.) 18, K

62. What is the new distance and next hop for going to H?
- A.) 0, A
 - B.) 3, I
 - C.) 12, H
 - D.) 18, K
63. What is the new distance and next hop for going to L?
- A.) 6, A
 - B.) 13, I
 - C.) 14, H
 - D.) 15, K
64. What does the window field in a TCP segment indicate?
- A.) Number of 32-bit words in the header
 - B.) Number of the called port
 - C.) Number used to ensure correct sequencing of the arriving data
 - D.) **Number of octets that the device is willing to accept**
65. What do TCP and UDP use to keep track of different conversations crossing a network at the same time?
- A.) **Port numbers**
 - B.) IP addresses
 - C.) MAC addresses
 - D.) Route numbers
66. Which range of port numbers is unregulated?
- A.) Below 255
 - B.) Between 256 and 512
 - C.) Between 256 and 1023
 - D.) **Above 1023**
67. Which of the following is incorrect for the TCP header fields?
- A.) The source port has 16 bits.
 - B.) The URG has just 1 bit.
 - C.) **The Window size has 32 bits. 32**
 - D.) The acknowledgement number has 32 bits.
68. How does TCP synchronize a connection between the source and the destination before data transmission?
- A.) Two-way handshake
 - B.) **Three-way handshake**
 - C.) Four-way handshake

- D.) None of the above
69. What is true for TCP' s retransmission timer?
- A.) Fixed value to allow 90% of segments arrive without retransmission
 - B.) Fixed value to allow 80% of segments arrive without retransmission
 - C.) Dynamic value based on the past successful transmission history
 - D.) Dynamic value based on the last successful transmission' s RTT**
70. UDP segments use what protocols to provide reliability?
- A.) Network layer protocols
 - B.) Application layer protocols
 - C.) Internet protocols
 - D.) Transmission control protocols
71. Which of the following is most appropriate?
- A.) UDP just provides an interface to the IP protocol with the added feature of demultiplexing multiple processes using the ports.
 - B.) UDP can be used to implement RPC.
 - C.) UDP can be used to implement RTP.
 - D.) All of the above.**
72. Which of the following is a basic service of the transport layer?
- A.) Provides reliability by using sequence numbers and acknowledgements
 - B.) Segments upper-layer application data
 - C.) Establishes end-to-end operations
 - D.) All of the above
73. The TCP primitives depend on _____.
- A.) both the operating system and the TCP protocol.
 - B.) the operating system only.
 - C.) the TCP protocol only.
 - D.) the operating system and the TCP protocol and the IP protocol.
74. The default port for TELNET is _____.
- A.) 21
 - B.) 22
 - C.) 23**
 - D.) 24
75. Which of the following is incorrect?
- A.) DNS stands for Domain Name System.
 - B.) There is only one record associated with every IP.
 - C.) Domain names can be either absolute or relative.

- D.) Domain names are case insensitive.
76. What does MIME stand for?
- A.) Messages In Multi Encoding
 - B.) Multipurpose Internet Mail Extensions
 - C.) Multipurpose Internet Mail Encoding
 - D.) None of the above
77. Which of the following is not a protocol for email?
- A.) SMTP
 - B.) POP3
 - C.) IMAP
 - D.) **GOPHER**
78. Which of the following is incorrect?
- A.) HTML stands for HyperText Markup Language.
 - B.) XML stands for eXtensible Markup Language.
 - C.) XHTML stands for eXtended HyperText Markup Language.
 - D.) A browser can display HTML documents as well as XML documents.
79. Which of the following tags is used to define a hyperlink?
- A.) <hlink ...> ... </hlink>
 - B.) <link ...> ... </link>
 - C.) <a ...> ...
 - D.) <form ...> ... </form>
80. Which of the following is not a built-in HTTP request methods?
- A.) GET
 - B.) POST
 - C.) PUT
 - D.) FETCH
81. Which of the following is not able to generate dynamic content on the server side?
- A.) CGI
 - B.) JSP
 - C.) ASP
 - D.) **JavaScript**
82. Which of the following is able to generate dynamic content on the client side?
- A.) Java Applet
 - B.) JavaScript
 - C.) ActiveX

- D.) All of the above
83. Which of the following is true?
- A.) WAP 1.0 is successful while I-Mode is not.
 - B.) I-Mode is successful while WAP 1.0 is not.
 - C.) Both WAP 1.0 and I-Mode are successful.
 - D.) Neither WAP 1.0 nor I-Mode is successful.
84. Which of the following security policies is hopeless?
- A.) 802.11 WEP
 - B.) Bluetooth security
 - C.) WAP 2.0 security
 - D.) None of the above
85. Which of the following is incorrect?
- A.) X.509 can be used to describe the certificates.
 - B.) An organization that certifies public keys is now called a CA.
 - C.) The Diffie-Hellman key exchange allows strangers to establish a shared secret key.
 - D.) The Diffie-Hellman key exchange can be attacked by the bucket brigade or man-in-the-middle attack.
86. In a public key encryption system, a sender has encrypted a message with the recipient's public key. What key does the recipient use to decipher the message?
- A.) The recipient's private key.
 - B.) The recipient's public key.
 - C.) The sender's private key.
 - D.) The sender's public key.
87. Which of the following statements is true of *ping*?
- A.) The *ping* command is used to test a device's network connectivity.
 - B.) The *ping* stands for packet Internet groper
 - C.) The *ping 127.0.0.1* command is used to verify the operation of the TCP/IP stack.
 - D.) All of the above.
88. Which of the following can be used to test application protocols?
- A.) ping
 - B.) tracer
 - C.) netstat
 - D.) telnet
89. Which of the following can be used to display TCP connections?

- A.) ping
- B.) tracert
- C.) netstat
- D.) telnet

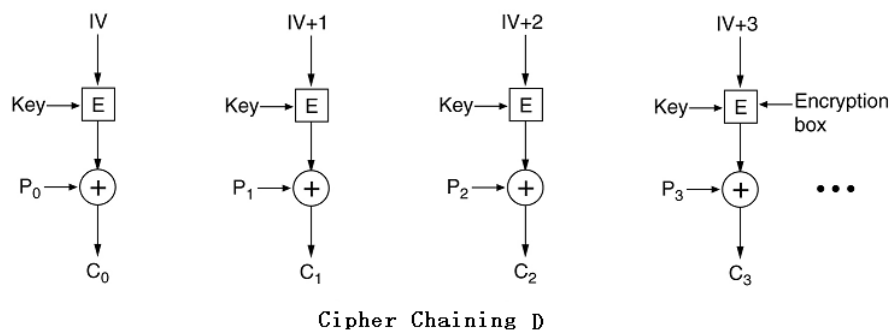
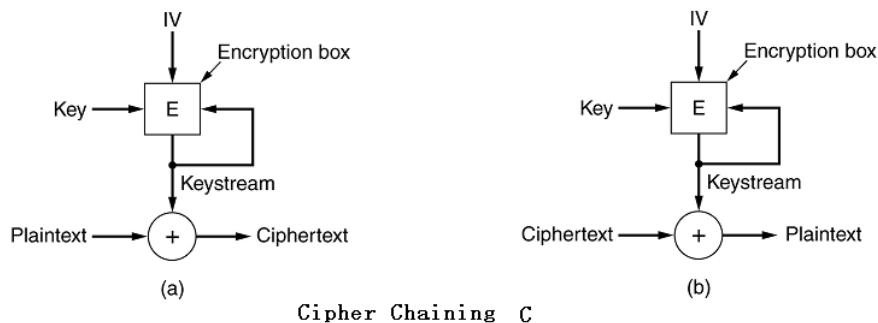
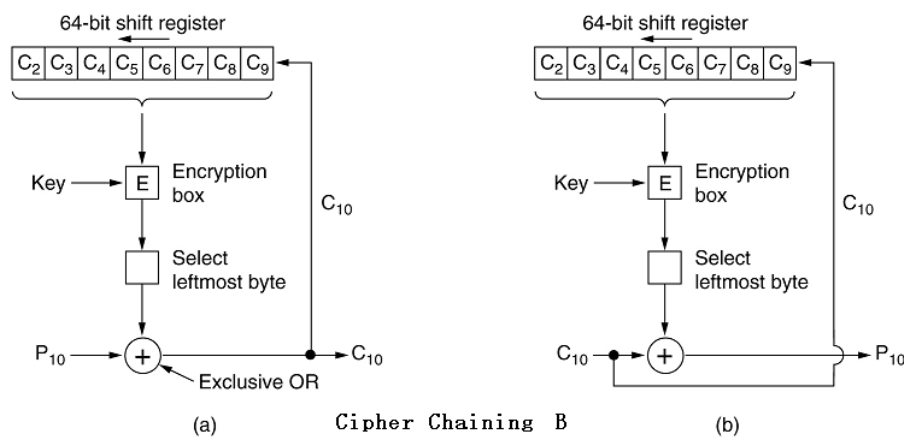
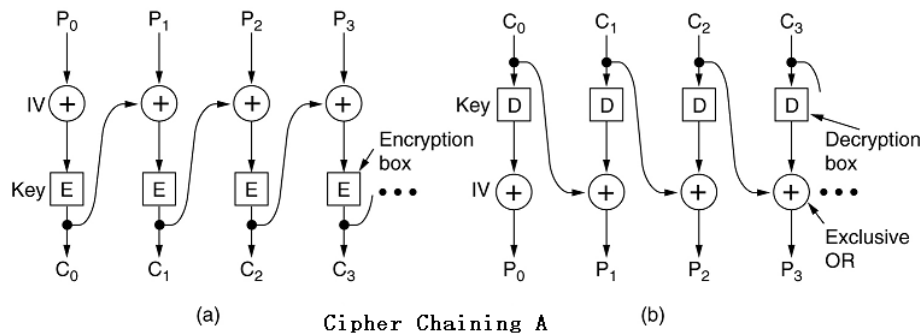
90. Which of the following system calls is used to create a server socket?

- A.) socket
- B.) open
- C.) request
- D.) creat

91. Which of the following system calls is to specify queue size for a server socket?

- A.) bind
- B.) size
- C.) listen
- D.) accept

For the following cipher chaining modes, please answer the following three questions.

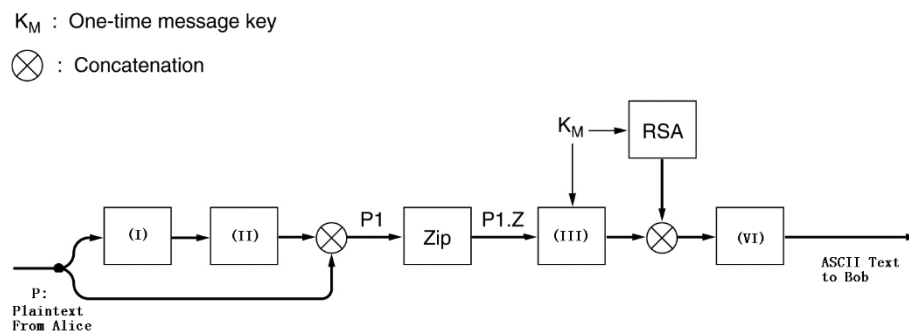


92. Which mode is most suitable for use with interactive terminals?

- A.) Cipher chaining A
- B.) Cipher chaining B

- C.) Cipher chaining C
D.) Cipher chaining D
93. Which mode is most suitable for use with real-time streaming?
A.) Cipher chaining A
B.) Cipher chaining B
C.) Cipher chaining C
D.) Cipher chaining D
94. Which mode is most suitable for use with disk files?
A.) Cipher chaining A
B.) Cipher chaining B
C.) Cipher chaining C
D.) Cipher chaining D
95. Which of the following is the strongest symmetric-key encryption algorithm?
A.) DES
B.) AES
C.) RSA
D.) MD5
96. Which of the following is the strongest public-key encryption algorithm?
A.) DES
B.) SHA-1
C.) RSA
D.) MD5

Consider the figure shown below, which takes some plaintext as input and produces signed ciphertext in some ASCII format as output. Please answer the next questions



97. Which of the following should be used for blank (I)?
A.) DES
B.) AES

- C.) MD5
- D.) None of the above

98. Which of the following should be used for blank (II)?

- A.) RSA with Alice' s private RSA key
- B.) RSA with Alice' s public RSA key
- C.) RSA with Bob' s private RSA key
- D.) RSA with Bob' s public RSA key

99. Which of the following should be used for blank (III)?

- A.) MD5
- B.) AES
- C.) SHA-1
- D.) Base64 encoding

100. Which of the following should be used for blank (IV)?

- A.) MD5
- B.) AES
- C.) SHA-1
- D.) None of the above

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一. Please select the best choice for following questions (80 points)

===== 7 chap 1 =====

1. Which one is not the protocol layer of OSI model?

- A. host-to-network
- B. session
- C. application
- D. transport

Answer: A

2. A notebook computer which connects to Internet via ADSL is _____.

- A. not wireless and not mobile
- B. not wireless but mobile
- C. wireless and not mobile
- D. wireless and mobile

Answer: B

3. There are two types of transmission technology that are in widespread use. They are Broadcast links and _____.

- A. end-to-end links
- B. Point-to-point links.
- C. peer-to-peer links
- D. token ring links.

Answer: B

4. The collection of communication lines and routers (but not hosts) form the _____.

- A. LAN
- B. routing algorithm.
- C. subnet
- D. switching device

Answer: C

5. _____ is a standard for high bandwidth wireless WANs.

- A. 802.11 B. 802.3.
C. 802.16 D. 802.5

Answer: C

6. Connectionless Services is also called _____.

- A. virtual circuit service B. Acknowledged datagram service
C. client-server service D. datagram service

Answer: D

7. _____ is not a kind of connection-oriented networks.

- A. X.25 B. Frame Relay C. ATM D. 802.11 LAN

Answer: D

===== 10 chap 2 physical layer =====

8. A noisy channel has a bandwidth of 3 KHZ, its S/N ratio is 2047, then its maximum data rate will be _____ .

- A. 33 kbps B. 66 kbps C. 132 kbps D. 4 kbps

Answer: A

9. _____ coaxial cable is commonly used for analog transmission and cable television.

- A. 50-ohm B. 75-ohm C. 300-ohm D. 120-ohm

Answer: B

10. which one is not a key component of optical transmission system?

- A. LED B. fiber optical cable C. gateway D. optical receiver

Answer: C

11. Which description is false for microwave transmission system?

- A. microwaves don't travel in a straight line.
B. multipath fading is a serious problem.
C. microwaves can not pass through buildings easily.
D. microwaves at about 4 GHZ is easy to be absorbed by rain.

Answer: A

12. The two-wire connections between each user's telephone and the end office are known as the _____ .

- A. trunk B. local loop C. PCM D. digital trunk

Answer: B

13. PCM, full name is _____ Code Modulation.

- A. Pulse B. Packet C. Point D. Peer

Answer: A

14. Different Fourier components propagate at different speed, this leads to _____.

- A. attenuation B. crosstalk C. thermal noise D. Delay distortion

Answer: D

15. _____ is not a modulation technology in MODEM.

- A. Amplitude modulation B. Frequency shift keying
C. PCM D. Phase modulation

Answer: C

16. A connection that allows traffic either way, but only one way at a time is called _____.

- A. full duplex B. half duplex
C. simplex D. QPSK

Answer: B

17. An E1 channel contains 32 PCM signals, its data rate is _____.

- A. 2.048 Mbps B. 1.544 Mbps
C. 64kbps D. 2.5 Gbps

Answer: A

18. _____ does not use store-forward technology.

- A. Message Switching B. Packet Switching
C. Circuit Switching D. Router

Answer: C

===== 6 chap 3 data link =====

19. Which service is never provided by data link layer?

- A. Unacknowledged connectionless service
B. Data fragmenting service
C. Acknowledged connectionless service
D. Acknowledged connection-oriented service

Answer: B

20. Which framing method is not used by data link layer?

- A. feedback_based flow control
B. character stuffing
C. Bit stuffing
D. Physical layer coding violation

Answer: A

21. Bit string 0101111110 will become _____ after bit stuffing.

- A. 01011110110
B. 0101111110

C. 01011111010

D. 01011111100

Answer: C

22. Current sending window covers sequence numbers 3-6 and the sending window size is 4, sequence number takes 3 bit. After frames with sequence number 3 and 4 are sent and both are acknowledged, which frames can be sent?

A. frames with sequence number 3,4,5,6 B. frames with sequence number 5,6,7

C. frames with sequence number 5,6 D. frames with sequence number 5,6,7,0

Answer: D

23. A HDLC frame includes fields flag, address, control, data and _____ .

A. checksum B. protocol C. LCP D. NCP

Answer: A

24. LCP and NCP are sub-protocols of _____ .

A. SDLC B. HDLC C. PPP D. IPX

Answer: C

===== chap 4 MAC =====

25. _____ is not a method of static channel allocation.

A. FDM B. TDM C. WDM D. CSMA

Answer: D

26. In pure ALOHA system, the maximum throughput occurs at $G=0.5$, with $S=$ _____. Here G is the generated mean frame numbers per frame time, S is the successfully transmitted frames per frame time.

A. 0.184 B. 0.368 C. 1 D. 0.5

Answer: A

27. When a station has data to send, it first listens to the channel, if the channel is busy, the station waits until it becomes idle, then it transmits the frame. If the channel is idle, the station transmits it immediately. Such carrier sense protocol is called _____.

A. 1-persistent CSMA B. Nonpersistent CSMA
C. p-persistent CSMA D. ALOHA

Answer: A

28. CSMA/CD protocol is not used in _____ .

A. 10Base-2 network B. 10Base-T network
C. 10Base-5 network D. Wireless LAN

Answer: D

29. Which is not the feature of Manchester encoding?

A. A binary 1 bit is sent by having the voltage set high during the first interval and low in the second one.

B. Every bit period has a transition in the middle.

C. Using +1 volts for a 1 and -1 volts for a 0.

D. It requires twice as much bandwidth as straight binary encoding.

Answer: C

30. Ethernet has the ability of _____.

A. unicast

B. multicast,

C. broadcast

D. all of above

Answer: D

31. Which type of connector is used to connect thin coaxial cable to 10Base-2 network adapter card?

A. RJ-11

B. RJ-80 transceiver

C. BNC T-connector

D. repeater

Answer: C

32. IEEE's standard for fast Ethernet is _____ ?

A. 802.3ab

B. 802.3u

C. 802.3 z

D. 802.3 i

Answer: B

33. Carrier extension is a feature of Gigabit Ethernet to _____ .

A. increase the transmission distance

B. increase the data rate

C. enhance the reliability

D. buffer incoming frames

Answer: A

34. 802.11 Frame includes _____ address fields.

A. 1

B. 2

C. 3

D. 4

Answer: D

35. When a transparent bridge receives a frame, and the frame's destination host locates on the same LAN segment where the frame is received, the bridge will _____.

A. discard the frame

B. forward the frame

C. use flooding to broadcast the frame

D. store the frame

Answer: A

36. Which device can split an Ethernet into several broadcast domains?

A. hub

B. switch

C. router

D. transparent bridge

Answer: C

37. Which device works in physical layer?

- A. hub B. switch C. router D. bridge

Answer: A

38. VLAN can be identified according to _____ .

- A. switch port B. MAC address C. layer 3 protocol D. all of above

Answer: D

===== chap 5 network layer =====

39. IP addresses 153.23.4.72 is a class _____ address.

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

Answer: B

40. A _____ message is sent when a packet is dropped because its "Time To Live" count reached zero.

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

Answer: C

41. The RIP protocol is a distance vector protocol while the OSPF protocol is a _____ protocol.

- A. link state B. flooding C. static routing D. Ad Hoc

Answer: A

42. In a TCP/IP network, which part of the IP address does a router use to determine the destination network?

- A. Network ID B. Host ID
C. subnet-mask D. Network ID and subnet ID

Answer: D

43. Which one is not the work of a router?

- A. Forwarding datagram
B. Filling and updating the route table
C. broadcasting datagram to all interfaces (except the receiving interface)
D. exchanging information with other router

Answer: C

44. Which step is not included in link state routing algorithm?

- A. Discovering router's neighbors and learn their network address
B. Constructing a link state packet
C. Computing the shortest path to every other router
D. Sending routing table to all neighbors

Answer: D

45. The source and destination hosts are on the same type of network, but there is a different network in between. We can use _____ technique to transfer packet between the source and destination hosts.

- A. tunneling B. Fragmentation
C. NAT D. CIDR

Answer: A

46. BGP is a _____ .

- A. Interior Gateway Protocol B. Exterior Gateway Protocol
C. static routing protocol D. link state routing protocol

Answer: B

47. _____ is not a field in the header of IP datagram.

- A. Time to live B. protocol
C. Total length D. Timestamp

Answer: D

48. Router A's routing table is shown in table 1. When router A receives a packet with destination address 16.109.110.21, the packet will be forwarded to next router _____ .

- A. 16.108.19.22 B. 20.7.7.13
C. 16.108.19.18 D. 16.108.19.30

Answer: C

Table 1. Router A's routing table

Destination network	Subnet mask	Outgoing interface	Next router
16.109.120.0	255.255.255.0	Serial3/2	16.108.19.22
16.108.18.16	255.255.255.252	Serial3/0	20.7.7.13
16.109.110.0	255.255.255.0	Serial3/1	16.108.19.18
16.108.30.0	255.255.255.0	Ethernet0/0	16.108.19.30
16.108.19.0	255.255.255.0	Ethernet0/0	Direct connected
0.0.0.0	0.0.0.0	Serial3/1	16.108.19.18

49. According to table 1, when router A receives a packet with destination address 16.109.18.17, the packet will be forwarded to next router _____ .

- A. 16.108.19.22 B. 20.7.7.13
C. 16.108.19.18 D. 16.108.19.30

Answer: C

50. According to table 1, when router A receives a packet with destination address 17.10.109.132, the packet will be forwarded to next router _____ .

- A. 16.108.19.22 B. 20.7.7.13
C. 16.108.19.18 D. 16.108.19.30

Answer: C

51. According to table 1, when router A receives a packet with destination address 16.108.19.13, the packet will be forwarded from interface _____ .

- A. Serial3/2
- B. Serial3/0
- C. Ethernet0/0
- D. Serial3/1

Answer: C

52. An IP address could include 3 parts: network number, subnet number, and host number, CIDR can use part of _____ to extend host number.

- A. subnet number
- B. subnet mask
- C. network number
- D. host number

Answer: C

53. _____ connect two or more areas.

- A. Backbone routers
- B. AS boundary routers
- C. Internal routers
- D. Area border routers

Answer: D

54. _____ is not a legal IPV6 address.

- A. 192.31.20.46
- B. 8300::1382:4567:89AB:CDEF
- C. ::192.31.20.46
- D. 6C00:0000:0000:0000:0123:4567:89AB:CDEF

Answer: A

===== chap 6 transport layer =====

55. Which problem does the three-way handshake protocol solve?

- A. data loss
- B. congestion
- C. synchronization
- D. delayed duplicate TPDUs

Answer: D,C

56. Which one is not the primitive for a simple transport service?

- A. listen
- B. gethostbyname
- C. connect
- D. receive

Answer: B

57. In the socket programming model, which one is used to block the caller until a connection attempt arrives?

- A. socket
- B. bind
- C. listen
- D. accept

Answer: D

58. In the process of transport connection release, two-army problem tells us that _____ .

- A. Handshake of two-way can solve this problem.
- B. Handshake of three-way can solve this problem.
- C. Handshake of four-way can solve this problem.

D. No protocol exists to solve this problem.

Answer: D

59. _____ is based on UDP.

A. DNS

B. FTP

C. HTTP

D. SMTP

Answer: A

60. RTP has _____.

A. flow control

B. no error control

C. retransmission

D. acknowledgement

Answer: B

61. Which is not the feature of TCP connections?

A. full-duplex

B. It supports broadcasting.

C. It is a byte stream.

D. point-to-point

Answer: B

62. If the congestion window size is 20KB, and the receive window size is 50KB, what is the maximum bytes the TCP entity can transmit?

A. 20KB

B. 50KB

C. 70KB

D. 30KB

Answer: A

===== chap 7 application layer =====

63. The resolver in DNS client sends a UDP 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

Answer: C

64. The resource record type _____ specifies the name of the host prepared to accept e-mail for the specified domain.

A. HINFO

B. A

C. SOA

D. MX

Answer: D

65. The Movie information in a email will be encoded as MIME message and its MIME type/subtype is _____.

A. Video/Mpeg

B. Image/gif

C. Message/rfc822

D. Multipart/mixed

Answer: A

66. SMTP uses server port _____.

- A. 25 B. 80
C. 1021 D. 110

Answer: A

67. When a user clicks on a hyperlink, <http://www.itu.org/home/index.html>, the browser carries out a series of steps in order to fetch the page pointed to. Which one is not among these steps?

- A. The browser asks DNS for the IP address of www.itu.org.
B. The browser makes a TCP connection to port 80 on 156.106.192.32.
C. The www.itu.org server sends the file /home/index.html.
D. A plug-in is removed from the browser's memory.

Answer: D

68. _____ is not a technology used by web server to speed up the page file access.

- A. disk cache
B. multithread
C. helper application
D. server farm

Answer: C

69. _____ could not be used as protocol part of URL(Uniform Resource Locator) .

- A. file B. http
C. smtp D. ftp

Answer: C

70. HTML tag _____ is used to define a hyperlink .

- A. <head > B.
C. <title > D.

Answer: B

71. In HTML we can use "form" to input data and submit them to web server , _____ is not a legal built-in type for the <input> tag.

- A. checkbox B. radio
C. text D. cgi

Answer: D

72. A web server can provide _____ to client computer's browser along with the requested page, which is then stored in the client computer.

- A. cookie B. form C. cgi-bin D. base64

Answer: A

73. _____ could not be used to generate dynamic content on the server side.

- A. PHP script B. Applet C. Java Server Pages D. Active Server Pages

Answer: B

74. Several programming technologies could be used to generate client-side dynamic web pages, among them _____ runs faster of all.

- A. ActiveX controls B. Java Applet C. Java script D. CGI script

Answer: A

75. _____ is not the feature of WAP 2.0.

- A. Support for ActiveX controls B. Push model
C. Multimedia messaging D. Support for plug-ins in the browser

Answer: A

76. In ARPANET, the subnet would consist of minicomputers called _____ connected by 56-kbps transmission lines.

- A. proxy server B. bridges
C. IMPs D. NAT gateway

Answer: C

77. _____ allows programs to call procedures located on remote hosts, and has become the basis for many networking applications.

- A. C/S mode B. RTCP
C. RPC D. RTP

Answer: C

78. Connections are established in TCP by means of the _____ .

- A. two-way handshake B. three-way handshake
C. stop-and-wait D. Symmetric release

Answer: B

79. XML describes Web content in a structured way and second, _____ describes the formatting independently of the content.

- A. FORM B. ASP
C. XSL D. JSP

Answer: C

80. To solve the problem of World Wide Wait, researchers have developed various techniques for improving performance, these technologies include caching, server replication, and _____ .

- A. CDN B. Redirection
C. CIDR D. subnet

Answer: A

二. Please choose true(T) or false(F) for the following questions. (20 points)

1. (T) In 802.11 LAN, if station X received RTS, but did not receive CTS, then X can transmit its data and will not interfere with other stations.
2. (F) The baud rate is the number of samples/second, each sample sends one symbol, so the baud rate is equal to bit rate.
3. (T) In a Go-Back-n protocol of data link layer, the sequence number takes 4 bit, then the maximal sending window size will be 15.
4. (F) SLIP and PPP do not provide any form of authentication.
5. (T) V.90 modem provides for a 33.6-kbps upstream channel (user to ISP), but a 56 kbps downstream channel (ISP to user) because there is usually more data transport from the ISP to the user than the other way.
6. (F) According to IEEE 802.1Q, the computer which originally sends the frame will add a VLAN tag to the frame.
7. (F) In a datagram subnet, the route is chosen only when the connection is established.
8. (T) In IPv6, More attention has been paid to real-time data.
9. (T) Clark's solution solves the problem of silly window syndrome, it prevents the receiver from sending a window update for 1 byte.
10. (F) At present, transmission line noise is the main cause of losing packet.
11. (F) Technology literatures of TCP/IP are released by a series of technical reports called protocol stack, they are stored on-line and are numbered in chronological order of creation. **protocol stack → RFCs**
12. (F) The range of frequencies transmitted without being strongly attenuated is called the broadband network, which is the frequencies range of signal to be permitted to pass in transmission media. **broadband network → bandwidth**
13. (T) If the fiber's diameter is reduced to a few wavelengths of light, the fiber acts like a wave guide, and the light can propagate only in a straight line, without bouncing, such optical fiber is called single-mode fiber.
14. (T) DMT is another transmission approach of ADSL, it divides the available 1.1 MHz spectrum on the local loop into 256 independent channels of 4312.5 Hz each.
15. (F) Protocols in which the sender sends one frame and then waits for an acknowledgement before proceeding are called Go-back-N Protocols. **Go-back-N → stop-and-wait**
16. (T) In PPP, a link control protocol is used for bringing lines up, testing them, negotiating options, and bringing them down again gracefully when they are no longer needed. This protocol is called LCP.
17. (F) MAC is the upper half of the data link layer in LAN. **MAC → LLC**
18. (T) Problems with wireless LAN include hidden station problem and exposed station problem .
19. (F) Every incoming packet is sent out on every outgoing line of router except the one it arrived on, such routing algorithm is called dynamic routing. **dynamic routing → flooding**
20. (F) Internet protocol ARP allows a newly-booted workstation to broadcast its

Ethernet address and say: My 48-bit Ethernet address is 14.04.05.18.01.25. Does anyone out there know my IP address? The corresponding server sees this request, looks up the Ethernet address in its configuration files, and sends back the requester's IP address. ARP → RARP

2007~2008 秋冬

- I. Please choose true or false for the following questions (write ✓ in the table if true, otherwise write ×) (15 points)
- (×) In the Internet, the IP protocol is a reliable, connectionless protocol.
 - (✓) The baud rate of the standard 10BASE-T Ethernet is 20M.
 - (✓) Each port of an Ethernet switch is in a different collision domain, but all ports of a same VLAN in the switch are in a same broadcast domain.
 - (×) According to the link state dynamic routing protocol, each router maintain a table giving the best known distance to each destination and which line to use to get there. These tables are updated by exchanging information with the neighbors.
 - (✓) When using streaming audio playing, the web server replies to the browser with a metafile instead of an audio file, and then, according to the URL in the metafile, the media player gets audio data frames to play.
 - (×) The quoted-printable encoding can be used for converting a non-ASCII email to an ASCII email, which operates by breaking three 8-bit bytes into four 6-bit bytes.
 - (✓) The maximum baud rate of a channel with bandwidth 3000 KHz is limited to 6000K.
 - (×) The connection-oriented communication is always reliable, because it has three phases: connection establish phase, data transfer phase and connection release phase.
 - (✓) When use TDM multiplexing, each user takes turns, periodically getting the entire bandwidth for a litter burst of time.
 - (✓) Although the Media Access Control sub layer of each type of LAN is different, the Logic Link Control sub layer of each is same.
 - (×) The CSMA/CA protocol is used in the 802.11 LAN to solve the exposed station problem and the hidden station problem. In this protocol, one station must send a CTS frame and wait a RTS frame back before sending a data frame.
 - (×) Java Script can be used for server-side dynamic web page generation.
 - (✓) Flow control is used at the transport layer to stop a receiving host's buffer from overflowing. In TCP, this can be done by setting the windows size to the free size of receiving buffer.
 - (✓) When using NAT, all private IP source address going to outside can be translated to the same public IP source address using different source port number.
 - (×) A host with address 192.168.0.1/24 can use ARP to find the MAC address of a host with address 192.168.1.1/24.

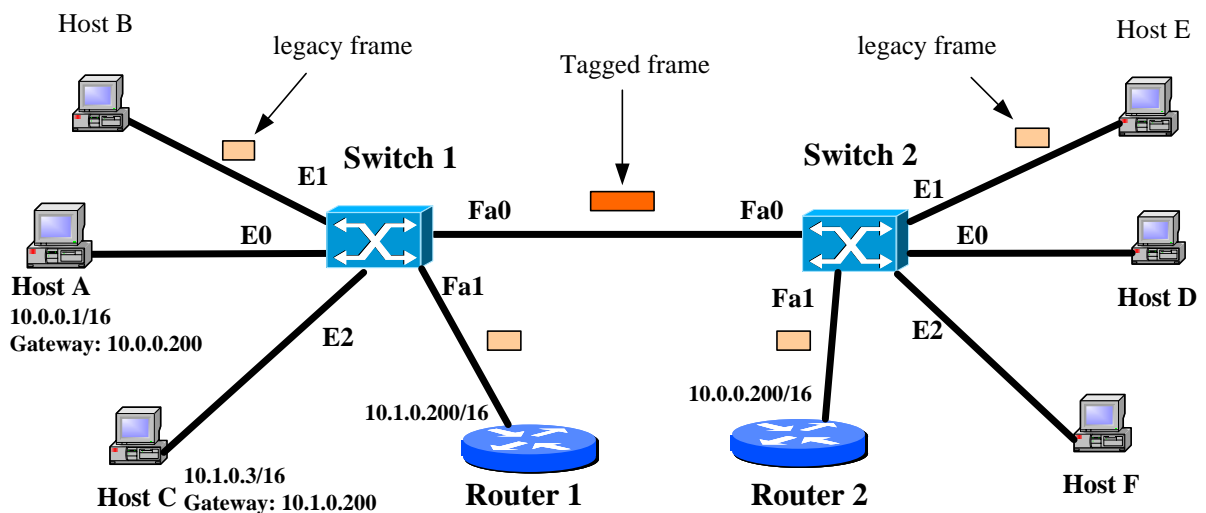
II. Please select the best choice for following questions, and fill the answer into the table (50 points)

1. What is the valid host range for subnet 172.16.10.16, Mask 255.255.255.240?
A. 172.16.10.20 through 172.16.10.22
B. 172.16.10.16 through 172.16.10.23
C. 172.16.10.17 through 172.16.10.31
D. 172.16.10.17 through 172.16.10.30
2. What range of addresses can be used in the first octet of a Class B network address?
A. 1–126
C. 128–191
B. 128–190
D. 129–192
3. A CRC generator polynomial is $G(x)=X^8+X^5+X^2+1$. How many bits will the checksum be?
A. 7
B. 8
C. 9
D. 10
4. If the length of sequence is 4 bits, the maximum sending window size should be _____.
A. 13
B. 14
C. 15
D. 16
5. If the congestion window size is 20KB, and the receive window size is 30KB, after sending a 10KB data, what is the maximum bytes can the TCP entity transmit now?
A. 10KB
B. 20KB
C. 30KB
D. 40KB
6. URL (Uniform Resource Locator) has three parts: the _____, the DNS name of the machine on which the page is located, and a local name uniquely indicating the specific page.
A. resource type
B. protocol
C. port number
D. IP address
7. _____, when it is used, a bad frame that is received is discarded, but the good frames received after it is buffered.
A. selective repeat
B. go back N
C. sliding window
D. stop and wait
8. When we use a modem, which use 16 phases signal to modulation, then how much can we get the maximum data rate in a 2400 baud channel (in noiseless channel)?
A. 400bps
B. 2400bps
C. 9.6kbps
D. 14.4kbps
9. _____ 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. Java Script
B. Java Applet
C. Java Bean
D. Java Server Page
10. What is the most efficient subnet mask to use on point-to-point WAN links (which only need 2 addresses)?
A. 255.255.255.240
B. 255.255.255.224
C. 255.255.255.252
D. 255.255.255.248
11. Suppose that the TCP congestion window is set to 18KB and a timeout occurs. How big will the window be if the next four transmission bursts are all successful? Assume that the maximum size of segment is 1KB.
A. 4KB
B. 8KB
C. 9KB
D. 16KB
12. Suppose a company has a class C address 198.16.10.0/24, it has 8 sub company, each of them has 20 host and need a network address, what is the subnet mask

should be?

- A. 255.255.255.192 B. 255.255.255.128
C. 255.255.255.240 D. 255.255.255.224
13. If a web server wants to save the user login name in the client side, then the client can send back the user login name at later access, which method can it use?
A. Applet B. Cookie C. ActiveX D. JavaScript
14. Which protocol is used for getting email to local disk?
A. Web Mail B. SMTP C. POP3 D. HTTP
15. Which protocol is about wireless LAN?
A. 802.3 B. 802.11 C. 802.4 D. 802.2
16. What multiple access protocol is used in Ethernet?
A. TokenRing B. ALOHA C. MACA D. CSMA/CD
17. Sending packet to a group of stations is called _____.
A. groupcast B. multicast C. broadcast D. unicast
18. Suppose the propagation time to reach the other end of the cable is t . To prevent a station from completing the transmission of a short frame before the first bit has even reached the far end of the cable, where it may collide with another frame, the sending time for all Ethernet frames must large than _____.
A. t B. $2t$ C. $0.5t$ D. $4t$

Question 19-21 are based following figure:



19. Suppose all hosts and all routers are legacy station (cannot realize the VLAN frame). The E0 and E1 port of Switch 1 all be configured as VLAN 2, the E2 port is configured as VLAN 3, all other ports are not be configured as any VLAN. To let host A and host B can communicate with each other, what address should host B be?
A. 10.0.0.2/16 B. 11.0.0.2/8 C. 10.1.0.2/16 D. 10.1.0.2/8
20. Continuous with the configuration of question above, suppose that each Fa0 port of two switch is VLAN-aware port (can realize the VLAN frame), the E0 port of switch 2 is configured as VLAN 2, the E1 and E2 port of switch 2 all be configured

as VLAN 3, the Fa1 port of switch 1 is configured as VLAN 3, the Fa1 port of switch 2 is configured as VLAN 2, all other configuration are not changed, what is the correct result?

- A. host A can ping host D
- B. host E can ping host B
- C. host D can ping host F
- D. host C can ping host E

21. Continuous with the configuration of question above, if the direct connection of router 1 and router 2 is established (not show in the figure) and router 1 can ping router 2, to let host F can ping host B, what address should host F be?

- A. 10.0.0.4/16 with gateway 10.0.0.200
- B. 10.0.0.4/16 with gateway 10.1.0.200
- C. 10.1.0.4/16 with gateway 10.1.0.200
- D. 10.1.0.4/16 with gateway 10.0.0.200

22. Company A has 12 network addresses (from 216.12.128.0 to 216.12.139.0), and Company B has 4 network addresses (from 216.12.140.0 to 216.12.143.0). The two companies connect the same router to Internet. To reduce the routing table size, all of the Internet routers can combine these 16 addresses into a single aggregate entry, what is it?

- A. 216.12.128.0/24
- B. 216.12.0.0/16
- C. 216.12.128.0/8
- D. 216.12.128.0/20

23. Suppose the receive buffer size is 100KB, there has used 40KB for data, and then following event occurs: new 40KB data arrives, and the application read 20KB data. Now, what is the receive windows size of TCP should be?

- A. 10KB
- B. 20KB
- C. 40KB
- D. 60KB
- E. 100KB

24. After the TCP entity send a TPDU with sequence number = 100 and data size = 100, and then send two TPDU again, each with data size = 100. The TCP peer entity all get them correctly, so it need send back an acknowledgement TPDU, what should the acknowledgement number be?

- A. 201
- B. 301
- C. 401
- D. 200
- E. 300
- F. 400

25. Following is a DNS database for zju.edu.cn:

zju.edu.cn	86400	IN	MX	1 mail.zju.edu.cn
zju.edu.cn	86400	IN	MX	2 smtp.zju.edu.cn
mail.zju.edu.cn	86400	IN	A	210.32.126.44
star.zju.edu.cn	86400	IN	A	210.32.126.45
smtp.zju.edu.cn	86400	IN	A	210.32.126.46
cs.zju.edu.cn	86400	IN	A	210.32.126.47
cs.zju.edu.cn	86400	IN	MX	1 abc.zju.edu.cn
abc.zju.edu.cn	86400	IN	CNAME	star.zju.edu.cn

What is the mail server address for liuxiao@cs.zju.edu.cn?

- A. 210.32.126.44
- B. 210.32.126.45
- C. 210.32.126.46
- D. 210.32.126.47

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

<u>Destination Address</u>	<u>Mask</u>	<u>Next hop</u>
----------------------------	-------------	-----------------

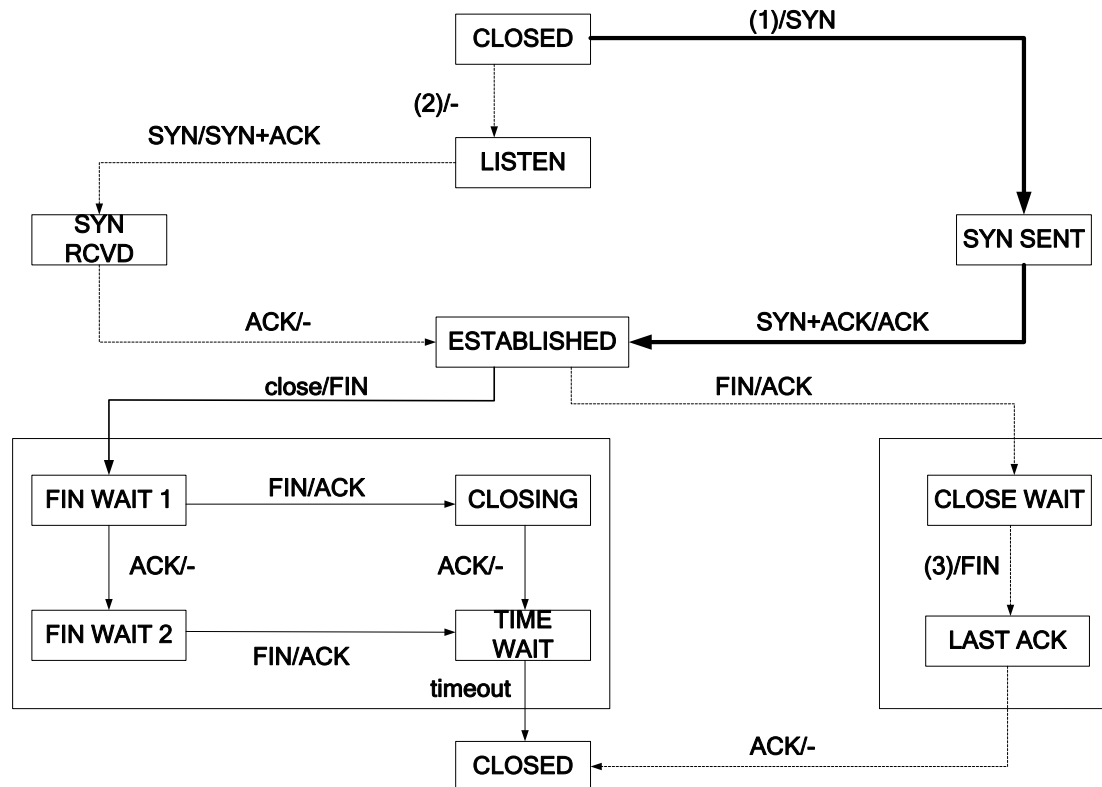
198.16.15.0	255.255.255.128	192.168.0.1
198.16.15.64	255.255.255.192	192.168.0.2
198.16.15.128	255.255.255.192	192.168.0.3
198.16.15.160	255.255.255.224	192.168.0.4
198.16.15.192	255.255.255.224	192.168.0.5
198.16.15.224	255.255.255.224	192.168.0.6
Default	0.0.0.0	192.168.0.7

For each of the following IP addresses, what does the router do if a packet with that destination address arrives (what is the next hop for each packet)? (10 points)

- 1) 198.16.15.80
- 2) 198.16.15.155
- 3) 198.16.15.165
- 4) 198.16.15.240
- 5) 198.16.15.126

Destination address of packet	Next hop
198.16.15.80	192.168.0.2
198.16.15.155	192.168.0.3
198.16.15.165	192.168.0.4
198.16.15.240	192.168.0.6
198.16.15.126	192.168.0.2

IV. See the TCP connection management finite state machine below, and answer the questions. Please fill the answer in the table according to the sequence. (10 points)



1. Please fill the blank in the graph with correct Berkeley Socket Primitives.

题号	(1)	(2)	(3)	(4)	(5)
答案	connect	listen	close	D	B C D

2. When the server application process calls the primitive 'accept', which connection will be handled by the application process? (4)

- A. The connection with state LISTEN
- B. The connection with state SYN RCVD
- C. The connection with state SYNSENT
- D. The connection with state ESTABLISHED**

3. Suppose the TCP connection states of two sides are ESTABLISHED, the server side sends a packet with the FIN bit set, and the client side sends back a packet with the ACK bit set only. Then, which description about the TCP connection state is true? (5)

- A. Neither the client nor the server application can read or send any data
- B. The client application can not send any data, but can still read the data already sent by the server application, the TCP server side will retransmit the data unacknowledged**
- C. The TCP server side will not retransmit the data unacknowledged, but the client application can still read the data already arrived**
- D. The server application can not send any new data, but can still read data**

VI. Following are some features about 5 issues: Circuit Setup, Addressing, Routing, Effect of router failures, and Quality of service. Please select the correct one for the virtual-circuit subnet and fill the feature label in the answer table. (5 points)

Issue \ Feature	A	B
Circuit Setup	Required	Not Required
Addressing	Each packet contains the full source and destination address	Each packet contain a short VC number
Routing	Route chosen when setup, all packets follow it	Each packet is routed independently
Effect of router failures	None, except for packets lost during the crash	All VCs that passed through the failed router are terminated
Quality of service	Difficult	Easy if enough resources can be allocated in advance for each VC

Issue	Feature
Circuit Setup	A
Addressing	B
Routing	A
Effect of router failures	B
Quality of service	B

2007~2008 春夏

一、 Please choose true or false for the following questions (write ✓ in the table if true, otherwise write ×) (10 points)

21. Cellular telephone is a high bandwidth wireless system.

False

22. A notebook computer with a 802.11 network adapter connecting to the Internet is a wireless and mobile computer.

TRUE

23. A cookie may contain up to five fields, one of them is security.

TRUE

24. SLIP and PPP do not provide any form of authentication.

False

25. In a datagram subnet, the route is chosen only when the connection is established.

False

26. In 802.11 LAN, if station X received RTS, but did not receive CTS, then X can transmit its data and will not interfere with other stations.

True

27. The basic function of RTP is to multiplex several real-time data streams onto UDP packets.

True

28. The base64 encoding can be used for converting a non-ASCII email to an ASCII email, which operates by breaking three 8-bit bytes into four 6-bit bytes.

True

29. PGP (Petty Good Privacy) encrypts data by using a block cipher called AES.

False

30. Large amounts of secret data are normally encrypted using secret-key (session key) cryptography, although public-key cryptograph (such as RSA), is widely used for the authentication protocol and for establish the session key.

True

二、 Please select the best choice for following questions, and fill the answer into the table *(50 points)*

101. The PDU for the transport layer of TCP/IP is also called _____.

- A.) packet
- B.) frame
- C.) bit
- D.) segment

102. There are two types of transmission technology that are in widespread use. They are as follows:

- A.) Broadcast links and point-to-point links.
- B.) Ethernet and X.25.
- C.) Ethernet and token ring.
- D.) End-to-end links and point-to-point links.

103. Wireless networks can be divided into three main categories: system interconnection, _____.

- A.) Bluetooth and 802.11.
- B.) Bluetooth and 802.16

- C.) wireless LANs and wireless WANs.
- D.) 802.5 and 802.11.

104. Which of the following statements best describes a MAN?

- A.) It connects LANs that are separated by a large geographic area such as several cities.
- B.) It is a privately-owned network within a single building or campus.
- C.) It is a privately-owned network within a single building or up to a few kilometers in size.
- D.) It covers a city.

105. Which type of network does Frame Relay belong to?

- A) circuit switching
- B) message switching
- C) packet switching
- D) frequency switching

106. Full name of P2P is _____ .

- A.) Peer to Peer
- B.) Person to Person
- C.) People to People
- D.) Protocol to Protocol

107. In original ARPANET, the subnet would consist of minicomputers called _____ .

- A.) repeater
- B.) switch
- C.) routers
- D.) IMPs

===== physical layer =====

108. A signal consists of 8 discrete levels, it is sent over a low-pass noiseless channel of bandwidth 4 kHz, what is the maximum achievable data rate?

- A.) 12000 bps
- B.) 24000 bps
- C.) 32000 bps
- D.) It can be infinite

109. If a digital signal is modulated and sent over a channel whose signal-to-noise ratio is 63:1, and its passed signal frequencies are 2 to 18 KHz, what is the maximum achievable data rate?

- A.) 9600 bps
- B.) 96000 bps
- C.) 19200 bps

D.) 192000 bps

110. Which is not the component of transmission system using signal-mode optical fiber?

- A.) LED
- B.) photodiode
- C.) optical fiber cable
- D.) semiconductor laser

111. What is the cable between two telephone switches that have a distance of 4 KM?

- A.) Subscriber loop
- B.) local loop
- C.) trunk
- D.) codec

112. 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

113. In packet switching, circuit switching and message switching, which one has the smallest transmission delay for data unit?

- A.) packet switching
- B.) circuit switching
- C.) message switching
- D.) both message switching and packet switching

===== Data link layer =====

114. A bit string, 10111 11101 11110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing?

- A.) 10111 110101 11110
- B.) 10111 11101 111100
- C.) 10111 111001 11110
- D.) None of the above

115. In _____-based flow control, the receiver sends back information to the sender giving it permission to send more data.

- A.) feedback
- B.) rate
- C.) PPP

D.) character

116. What is the remainder when dividing $x^7 + x^5 + 1$ by the generator polynomial $x^3 + 1$?

A.) $X^4 + x^2 + 1$

B.) $X^2 + x + 1$

C.) $X^2 + x$

D.) $X^2 + 2x$

117. Assume that Go-Back-N protocol and 3-bit sequence number are used, the sending window size is 5. After a station has sent the frame with sending sequence number 6, it receives an ACK frame with ACK sequence number 4, then the sending sequence number of the final frame that the station can send within sending window is ____.

A.) 1

B.) 2

C.) 7

D.) 0

118. For the above question, if the sending window size is 3, then the sending sequence number of the final frame is ____.

A.) 1

B.) 2

C.) 7

D.) 0

119. A data link protocol uses Go-Back-n, and 4 bits are used for sequence number, which is not allowed as sending window size?

A.) 15

B.) 16

C.) 1

D.) 8

===== MAC layer =====

120. When PCF (Point Coordination Function) is employed, users of 802.11 use a technology called ____.

A.) PCM

B.) FDM

C.) TDM

D.) WDM

121. Which uses the thin coaxial cable?

A.) 10Base5.

- B.) 10Base-F.
- C.) 10Base-T.
- D.) 10Base2.

122. Which of the following can be a substitution for ADSL in future?

- A.) 802.3
- B.) 802.11
- C.) 802.5
- D.) 802.16

123. Which is not the result of a broadcast storm?

- A.) The entire LAN capacity is occupied by these frames.
- B.) All the machines on all the interconnected LANs are busy with processing and discarding all the broadcast frames.
- C.) The bandwidth for normal traffic is little.
- D.) A loop will be formed.

124. Which is the broadcast address of Ethernet MAC frame?

- A.) FF-FF-FF-FF-FF-FF
- B.) FF-FF-FF-FF
- C.) 255.255.255.255
- D.) None of the above

125. Which description is false about the forwarding procedure of a bridge?

- A.) If destination and source LANs are the same, discard the frame.
- B.) If the destination and source LANs are different, forward the frame.
- C.) Every entry of the bridge's forwarding table will never be deleted.
- D.) If the destination LAN is unknown, use flooding.

126. Which device will extend the size of LAN's collision domain?

- A.) Bridge
- B.) repeater
- C.) switch
- D.) router

===== network layer =====

127. Which of the following statements about IPv4 header fields is incorrect?

- A.) IHL field tells how long the header is.
- B.) The Time to live field is a counter used to limit packet lifetimes.
- C.) The Protocol field tells network layer which upper-layer protocol process to give datagram to.
- D.) The Total length field indicates the payload length of the datagram.

128. Which is not the private address that will not appear in Internet datagram?
- A.) 10.8.8.8
 - B.) 192.168.8.8
 - C.) 12.8.8.8
 - D.) 172.16.8.8
129. The subnet mask is 255.255.255.248. How many hosts are available in this subnet?
- A.) 6
 - B.) 2
 - C.) 8
 - D.) 14
130. Which of the following statements about default route is correct?
- A.) In route table, a default route is an entry with the destination network 0.0.0.0 and subnet mask 0.0.0.0.
 - B.) In route table, a default route is an entry with the destination network 0.0.0.0 and subnet mask 255.255.255.255.
 - C.) If default route exists, it will be first selected and used.
 - D.) Default route provides the shortest path.
131. Which one is not a part of link-state routing algorithm?
- A.) A router discovers its neighbors and learn their network addresses.
 - B.) A router exchanges route table with its neighbors.
 - C.) A router measures the delay or cost to each of its neighbors.
 - D.) A router constructs a packet telling all it has just learned.
132. The problem of running out of IP addresses is not a theoretical problem that might occur at some point in the distant future. Some people felt that a quick fix was needed for the short term under current IPv4 environment. This quick fix came in the form of _____.
- A.) RARP
 - B.) NAT
 - C.) IPv6
 - D.) DHCP
133. Which is an illegal IPV6 address?
- A.) :210.23.187.24
 - B.) 3400::4443:89AB:EFBD
 - C.) 3400:0:0:C0E4:0:4443:89AB:EFBD
 - D.) ::3400:89AB:EFBD

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

134. Two-army problem tells us that _____.
A.) Three-way handshake is needed to establish a connection.
B.) Designing a perfect protocol to close a connection is extremely difficult.
C.) Three-way handshake is needed to close a connection.
D.) Two-way handshake is needed to close a connection.
135. Timestamp is used in _____.
A.) RPC
B.) UDP
C.) TCP
D.) RTP
136. Which protocol does not match its well known port?
A.) FTP vs 120
B.) Telnet vs 23
C.) HTTP vs 80
D.) SMTP vs 25
137. Which protocol uses TCP?
A.) RTP
B.) DNS
C.) POP-3
D.) RPC
138. If the congestion window size is 30KB, and the receive window size is 50KB, what is the maximum bytes the TCP entity can transmit before ACK comes back?
A.) 30KB
B.) 50KB
C.) 80KB
D.) 20KB

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

139. Which one is not a legal resource record in DNS server?
A.) www.zju.edu.cn 86400 IN SOA star boss (43271,7200,7200,2347,8792)
B.) zju.edu.cn 86400 IN MX 1 ema.zju.edu.cn
C.) www.zju.edu.cn 86400 IN HINFO Redhat Linux 9.0
D.) www.zju.edu.cn 86400 IN A zju.edu.cn
140. Which one is not a common protocol (or scheme) used in URL?
A.) FTP
B.) HTTP
C.) RPC
D.) File

141. Which one represents a correct HTML tag for form?
- A.) `<form ACTION="http://www.intel.com/cgi-bin/scpu" type=radio method=get>`
 - B.) `<form ACTION="http://www.intel.com/cgi-bin/scpu" type=text method=put >`
 - C.) `<form ACTION="http://www.intel.com/cgi-bin/scpu" method=post >`
 - D.) `<form ACTION="http://www.intel.com/cgi-bin/scpu" method=push >`
142. Client-side dynamic web page generation may use following technologies: JavaScript, Java applet, Activex control. Which of the following statements is incorrect?
- A.) JavaScript programs have the best portability among them.
 - B.) JavaScript programs are easier to write.
 - C.) Java applets execute faster.
 - D.) ActiveX controls run faster of all.
143. 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`
144. A cookie may contain five fields, Which one is not in these fields?
- A.) The domain field which indicates the server's domain name.
 - B.) The path field that identifies which parts of the server's file tree may use the cookie.
 - C.) The expire field that specifies when the cookie expires.
 - D.) The protocol field that specifies what protocol is used.
145. Common Gateway Interface (CGI) is a standardized interface to allow Web Server to talk to back-end programs and scripts, this Web Server sends pages to browser.
- A.) active
 - B.) form
 - C.) dynamic
 - D.) static

===== network security =====

146. The purpose of _____ is to prevent adversary from modifying or altering information.
- A.) secrecy
 - B.) authentication

C.) Integrity control

D.) nonrepudiation

147. In _____ each letter or group of letters is replaced by another letter or group of letters to disguise it.

A.) Transposition Cipher

B.) substitution cipher

C.) SHA-1

D.) MD5

148. _____ is based on Galois field theory, it uses substitution, permutations, and multiple rounds of calculations.

A.) DES

B.) AES

C.) MD5

D.) RSA

149. The Diffie-Hellman key exchange protocol allows two strangers to establish a shared secret key; however, it can be defeated by _____.

A.) bucket brigade attack

B.) reflection attack

C.) denial of service

D.) attack of electronic code book mode

150. Various schemes have been devised for digital signatures, using both symmetric-key and _____-key algorithms.

A.) one time

B.) private

C.) public

D.) session

三、 (21 points) In a TCP/IP network, an original IP datagram contains 1500 bytes of data (i.e. payload) and 36 bytes of header. When it passes through a router with the maximum datagram length (header + data) of 420 bytes, it breaks into multiple fragments. In the format (header length, total length, Identification, DF, MF, offset), the values of original datagram's header fields are (9, 1536, 13762, 0, 0, 0).

(1). The original datagram breaks into _____ fragments, the length of the first fragment's data part is _____ bytes, and the length of the last one's data part is _____ bytes.

(2). Please fill these fragment's header field values with the format (header length, total length, Identification, DF, MF, offset) in following blanks:

the first fragment: _____, _____, _____, _____, _____, _____

the second fragment: _____, _____, _____, _____, _____, _____

the last fragment: _____, _____, _____, _____, _____

answer: (1). The original datagram breaks into 4 fragments, the length of the first fragment's data part is 384 bytes, and the length of the last one's data part is 348 bytes.

(2). Please fill these fragment's header field values in a format (header length, total length, Identification, DF, MF, offset) in following blanket:

1# fragment (9, 420, 13762, 0, 1, 0)

2# fragment (9, 420, 13762, 0, 1, 48)

4# fragment (9, 384, 13762, 0, 0, 144)

四、 (10 points) Consider building a CSMA/CD network running at 100 Mbps over a 800-m cable without repeater. The signal speed in the cable is 200,000 km/sec, and station A and B are located in the two end of the cable. Please fill values in following blanks.

(1). The time to transmit 1 byte is noted as T, $T = \underline{(1)}$ μs , a frame can run (2) meters along the cable in interval T.

(2). The round trip time between A and B is (3) μs , the minimum frame size should be (4) bytes.

(3). If the data rate becomes 1 Gbps and the cable length becomes 200 meters, the minimum frame size should be (5) bytes.

=====

answer (1). The time to transmit 1 byte is noted as T, $T = \underline{0.08}$ μs , a frame can run 16 meters along the cable in interval T.

(2). The round trip time between A and B is 8 μs , the minimum frame size should be 100 bytes.

(3). If the data rate becomes 1 Gbps and the cable length becomes 200 meters, the minimum frame size should be 250 bytes.

五、 (9 points) HDLC and TCP are different protocols, some features are discussed as follows, please choose appropriate word from the optional words list and fill it in the blank.

(1). The sending sequence number of HDLC PDUs increments by 100 when 100 (1) are sent, while the sending sequence number of TCP PDUs increments by 100 when 100 (2) are sent.

(2). HDLC's sending window uses a (3) value; TCP's sending window uses a (4) value which is determined by the header field "(5)" of the TCP segment sent by receiver.

(3). TCP uses _____ (6) _____ handshake to establish a connection. Some segment's flag bit _____ (7) _____ is set to 1 during the period of connection establishment.

(4). In TCP, when receiver sends a PDU with its field _____ (8) _____ set to 0, the sender should stop sending data; In HDLC, when receiver sends a PDU with its field type set to 2 which stands for _____ (9) _____, the sender should stop sending data.

The optional words are listed as follows:

FIN, RECEIVE-NOT-READY, window-size, SYN, REJECT, bytes, datagrams, fixed, three-way, segments, RESET, two-way, variable, messages, frames, URG

Answer:

(1). The sending sequence number of HDLC PDUs increments by 100 when 100 frames are sent, while the sending sequence number of TCP PDUs increments by 100 when 100 bytes are sent.

(2). HDLC's sending window uses a fixed value; TCP's sending window uses a variable value which is determined by the header field "window-size" of the TCP segment sent by receiver.

(3). TCP uses three-way handshake to establish a connection. Some segment's flag bit SYN is set to 1 during the period of connection establishment.

(4). In TCP, when receiver sends a PDU with its field window-size set to 0, the sender should stop sending data; In HDLC, when receiver sends a PDU with its field type set to 2 which stands for RECEIVE-NOT-READY, the sender should stop sending data.

Chapter2 课堂练习

1. 如果在一条 3kHz 的信道上发送一个二进制信号, 该信道的信噪比为 20dB, 则最大可达到的数据传输率为多少?

Answer:

A signal-to-noise ratio of 20 dB means $S/N = 100$. Since $\log_2 101$ is about 6.658, the Shannon limit is about 19.975 kbps. The Nyquist limit is 6 kbps. The bottleneck is therefore the Nyquist limit, giving a maximum channel capacity of 6 kbps.

2. 有 10 个信号, 每个都要求 4000Hz, 现在用 FDM 将他们复用在一信道。对于被复用的信道, 最小要求多少带宽? 假设防护频段为 400Hz 宽。

Answer:

There are ten 4000 Hz signals. We need nine guard bands to avoid any interference. The minimum bandwidth required is $4000 \times 10 + 400 \times 9 = 43,600$ Hz.

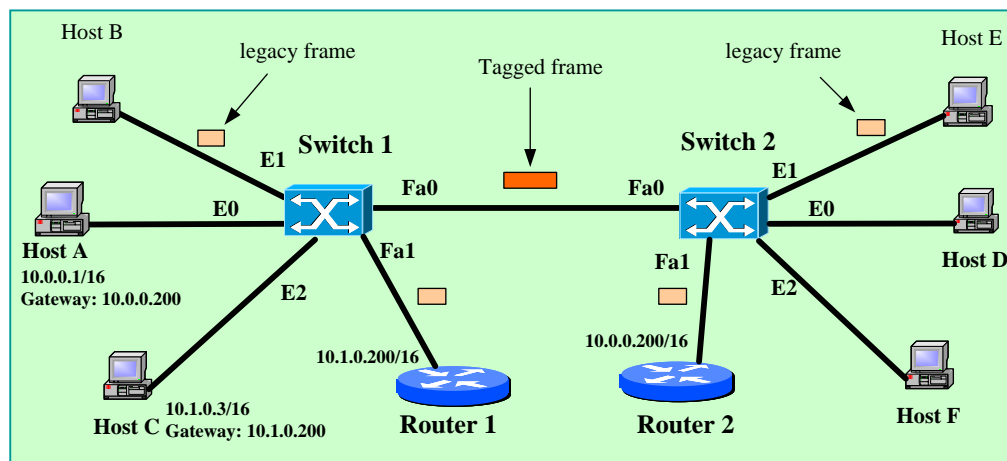
3. When we use a modem, which use 16 phases signal to modulation, then how much can we get the maximum data rate in a 2400 baud channel (in noiseless channel)?

- A. 400bps B. 2400bps C. 9.6kbps D. 14.4kbps

4. What is the remainder obtained by dividing $x^7 + x^5 + 1$ by the generator polynomial $x^3 + 1$?
A. 010 **B. 111** C. 101 D. 011
5. A CRC generator polynomial is $G(x)=x^8+x^5+x^2+1$. How many bits will the checksum be?
A. 7 **B. 8** C. 9 D. 10
6. To correct 2 single-bit errors, how many hamming distance do we need?
A. 3 B. 4 **C. 5** D. 6
7. What is the maximum sending window size of the **go-back-n** protocol when use 4 bits for frame serial number?
A. 4 B. 8 **C. 15** D. 16

Chapter4

Question 1-3 are based following figure:



1. Suppose all hosts and all routers are legacy station (cannot realize the VLAN frame). The E0 and E1 port of Switch 1 all be configured as VLAN 2, the E2 port is configured as VLAN 3, all other ports are not be configured as any VLAN. To let host A and host B can communicate with each other, what address should host B be?
A. 10.0.0.2/16 B. 11.0.0.2/8 C. 10.1.0.2/16 D. 10.1.0.2/8
2. Continuous with the configuration of question above, suppose that each Fa0 port of two switch is VLAN-aware port (can realize the VLAN frame), the E0 port of switch 2 is configured as VLAN 2, the E1 and E2 port of switch 2 all be configured as VLAN 3, the Fa1 port of switch 1 is configured as VLAN 3, the Fa1 port of switch 2 is configured as VLAN 2, all other configuration are not changed, what is the correct result?
A. host A can ping host D B. host E can ping host B
C. host D can ping host F D. host C can ping host E

3. Continuous with the configuration of question above, if the direct connection of router 1 and router 2 is established (not show in the figure) and router 1 can ping router 2, to let host F can ping host B, what address should host F be?

- A. 10.0.0.4/16 with gateway 10.0.0.200 B. 10.0.0.4/16 with gateway 10.1.0.200
C. 10.1.0.4/16 with gateway 10.1.0.200 D. 10.1.0.4/16 with gateway 10.0.0.200

4. 某局域网采用 CSMA/CD 协议实现介质访问控制，数据传输速率为 10Mbps，主机甲和主机乙之间的距离为 2km，信号传播速度是 200000km/s。请回答下列问题，要求说明理由或写出计算过程。

(1) 若主机甲和主机乙发送数据时发生冲突，则从开始发送数据时刻起，到两台主机均检测到冲突时刻止，最短需经过多长时间？最长需经过多长时间？（假设主机甲和主机乙发送数据过程中，其他主机不发送数据）

(2) 若网络不存在任何冲突与差错，主机甲总是以标准的最长以太网数据帧（1518 字节）向主机乙发送数据，主机乙每成功收到一个数据帧后立即向主机甲发送一个 64 字节的确认帧，主机甲收到确认帧后方可发送下一个数据帧。此时主机甲的有效数据传输速率是多少？（不考虑以太网帧的前导码）

4.题参考答案:

1、主机甲和主机乙之间单向传播延迟时间= $2\text{km} / (200000\text{km/s}) = 10\mu\text{s}$ ；

两台主机均检测到冲突时，最短所需时间和最长所需时间对应下面两种情况：

(A) 主机甲和主机乙同时发送一个数据帧，信号在信道中间发生冲突后，冲突信号继续向两个方向传播。因此，双方均检测到冲突需要 1 个单向传播延迟，即 $10\mu\text{s}$ 。因此，甲乙两台主机均检测到冲突时，最短需经过 $10\mu\text{s}$ 。

(B) 主机甲（或主机乙）先发送一个数据帧，当该数据帧即将到达主机乙（或主机甲）时，主机乙（或主机甲）也开始发送一个数据帧。这时，主机乙（或主机甲）将立即检测到冲突，而主机甲（或主机乙）要检测到冲突，冲突信号还需要从主机乙（或主机甲）传播到主机甲（或主机乙），因此，主机甲（或主机乙）检测到冲突需要 2 个单向传播延迟，即 $20\mu\text{s}$ 。因此，甲乙两台主机均检测到冲突时，最长需经过 $20\mu\text{s}$ 。

2、发送 1518 字节的数据帧所用时间（传输延迟）= $1518 \times 8\text{bits} / 10\text{Mbps} = 1214.4\mu\text{s}$ ；

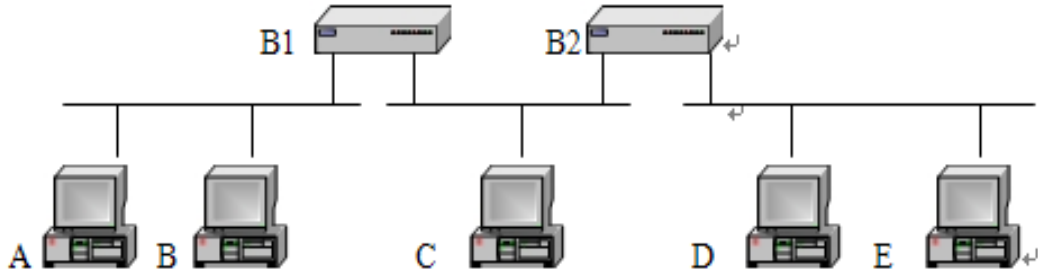
发送 64 字节的确认帧所用时间（传输延迟）= $64 \times 8\text{bits} / 10\text{Mbps} = 51.2\mu\text{s}$ ；

主机甲从发送数据帧开始到收完为止的时间记为 $T_{\text{总}}$ ，则

$$T_{\text{总}} = 1214.4 + 51.2 + 2 \times 10 = 1285.6\mu\text{s}；$$

在 $1285.6\mu\text{s}$ 内发送的有效数据长度 = $1518\text{B} - 18\text{B} = 1500\text{B} = 12000\text{bits}$ 。因此，主机甲的有效数据传输速率 = $12000\text{bits} / 1285.6\mu\text{s} = 9.33\text{Mbps}$ 。

- 下图表示有5个站分别连接在三个局域网，并且用网桥B1和B2连接起来。每一个网桥都有两个接口（1和2）。在一开始，两个网桥中的转发表都是空的。以后有以下各站向其他的站发送了数据帧：A发送给E，C发送给B，D发送给C，B发送给A。试把有关数据填写在表3-2中。



发送的帧	B1 的转发表		B2 的转发表		B1 的处理 (转发? 丢弃? 登记?)	B2 的处理 (转发? 丢弃? 登记?)
	地址	接口	地址	接口		
A→E	A	1	A	1	转发, 写入转发表	转发, 写入转发表
C→B	C	2	C	1	转发, 写入转发表	转发, 写入转发表
D→C	D	2	D	2	写入转发表, 丢弃不转发	转发, 写入转发表
B→A	B	1			写入转发表, 丢弃不转发	接收不到这个帧

1. What is the maximum frame size of the 10 Mbps Ethernet?
()
A. 46 bytes B. 64 bytes C. 1500 bytes **D. 1518 bytes**
2. What is the baud rate of classic 10-Mbps Ethernet?
()
A. 10MHz **B. 20Mhz** C. 25 D. 40
3. The Ethernet uses an algorithm called binary exponential back-off, after 4 collisions, the station will chose a random number between 0 and _____.
()
A. 7 B. 8 **C. 15** D. 16
4. What is the maximum recommended length of twisted-pair Ethernet cables used in home or business networks?
()
A. 10 meters **B. 100 meters** C. 1000 meters D. Other
5. Which PDU address does the Ethernet switch transfer data depending on?
()
A. **Destination physical address** B. Destination IP address
C. Source physical address D. Source IP address
6. According the CSMA/CA protocol used by 802.11, before the station sending a data, it must send _____ frame and wait a _____ frame back.
()
A. CTS, RTS B. DTR, CTS C. RTS, TCS **D. RTS, CTS**
7. Which carrier sense protocol will perform like this: if the channel is already in use, the station does not continually sense it for the purpose of seizing it immediately upon detecting the end of the previous transmission. It waits a random period of time and then repeats the algorithm. ()
A. 1-persistent CSMA **B. non-persistent CSMA** C. p-persistent CSM D. pure ALOHA
8. In a wireless LAN, the problem of a station not being able to detect a potential competitor for the medium because the competitor is too far away is called the _____ terminal problem. ()
A. exposed **B. hidden** C. inside D. Wireless
9. Which is not in the same collision domain?
()
A. all ports in a hub **B. all ports in a switch**
C. one port in a switch D. one port in a hub

10. What is the minimum frame size of the 10 Mbps Ethernet?
()
A. 512 bits B. 512 bytes C. 1500 bytes D. 1500 bits
11. All stations in the same VLAN are in the same _____ domain.
()
A. collision B. broadcast C. contention D. all of above

Chapter5

一、选择题:

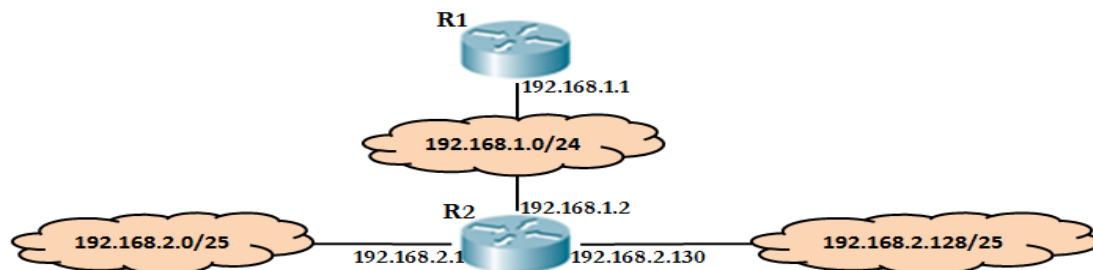
- Which is the IP address whose hexadecimal representation is 12230932?
A. 12.23.09.32 B. 18.35.09.50 C. 50.09.35.18 D. 32.09.23.12
- Which is a link state routing protocol?
A. RIP B. IGRP C. BGP D. OSPF
- The checksum in the IP packet covers _____.
A. just the header
B. just the data
C. the header and the data
D. just the source and destination addresses
- Which is not included in IP header?
A. network address B. TTL C. port D. protocol type
- Which is a special address, and can't be used for single host address?
A. 1.0.0.1 B. 123.0.0.1 C. 127.0.0.1 D. 223.0.0.1
- Which is not the private address range?
A. 10.0.0.0-10.255.255.255 B. 172.16.0.0-172.31.255.255
C. 11.0.0.0-11.255.255.255 D. 192.168.0.0-192.168.255.255
- What is the valid host range for subnet 212.10.10.32, mask 255.255.255.224?
A. 212.10.10.0 through 212.10.10.255
B. 212.10.10.32 through 212.10.10.63
C. 212.10.10.33 through 212.10.10.62
D. 212.10.10.1 through 212.10.10.254
- 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 135.46.95.2 arrives?

A. 192.168.0.1 B. 10.0.0.1 C. 172.16.0.1 D. 123.0.0.1

9. Using the routing table as above, which is the next hop if a packet with the destination address 135.46.161.2 arrives?
 A. 192.168.0.1 B. 10.0.0.1 C. 172.16.0.1 **D. 123.0.0.1**
10. There is a network as following figure. Router R1 has only a route to subnet 192.168.1.0/24. 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 |

二、 In a TCP/IP network, an original IP datagram contains 1500 bytes of data (i.e. payload) and 36 bytes of header. When it passes through a router with the maximum datagram length (header + data) of 420 bytes, it breaks into multiple fragments. In the format (header length, total length, Identification, DF,MF, offset), **the values of original datagram's header fields are (9,1536,13762,0,0,0).**

Answer:

(1). The original datagram breaks into 4 fragments, the length of the first fragment's data part is 384 bytes, and the length of the last one's data part is 348 bytes.

(2).

the first fragment: (9, 420, 13762, 0, 1, 0)

the second fragment: (9, 420, 13762, 0, 1, 48)

the last fragment: (9, 384, 13762, 0, 0, 144)

三、 A large number of consecutive IP address are available starting at 202.101.0.0. Suppose that four organizations, A, B, C, and D, request 1024, 2000, 2000, and 4000 addresses, respectively, and in that order.

Please assign the IP address and the mask in the w.x.y.z/s notation.

Answer:

202.101.0.0/22

202.101.8.0/21

202.101.16.0/21

202.101.32.0/20

Chapter6

- 1、一个 UDP 用户数据报的数据字段为 8192 字节。在链路层要使用以太网来传送。试问应当划分为几个 IP 数据报片？说明每一个 IP 数据报片的数据字段长度和片偏移字段的值。

答：6个。数据字段的长度：前5个是1480字节，最后一个是480字节。片偏移字段的值分别是：0，1480/8，2960/8，4440/8，5920/8和7400/8（或0，185,370,550,740,925）。

- 2、一个 UDP 用户数据报的首部的十六进制表示为：06 32 00 45 00 1C E2 17。试求源端口、目的端口、用户数据报的总长度、数据部分长度。这个用户数据报是从客户发送给服务器还是从服务器发送给客户？使用 UDP 的这个服务器程序是什么？

答：源端口1586、目的端口69、用户数据报的总长度28、数据部分长度20。这个用户数据报是从客户发送给服务器（因为目的端口号<1023，是熟知端口）。服务器程序是TFTP。

- 3、主机 A 向主机 B 连续发送了两个 TCP 报文段，其序号分别是 70 和 100。试问：

- （1）第一个报文段携带了多少字节的数据？
- （2）主机 B 收到第一个报文段后发回的确认中的确认号应当是多少？
- （3）如果 B 收到第二报文段后发回的确认中的确认号是 180，试问 A 发送的第二个报文段中的数据有多少字节？
- （4）如果 A 发送的第一个报文段丢失了，但第二个报文段到达了 B。B 在第二个报文段到达后向 A 发送确认。试问这个确认号应为多少？

答：（1）第一个报文段的数据序号是70到99，共30字节的数据。

（2）确认号应为100。

（3）80字节。

（4）70

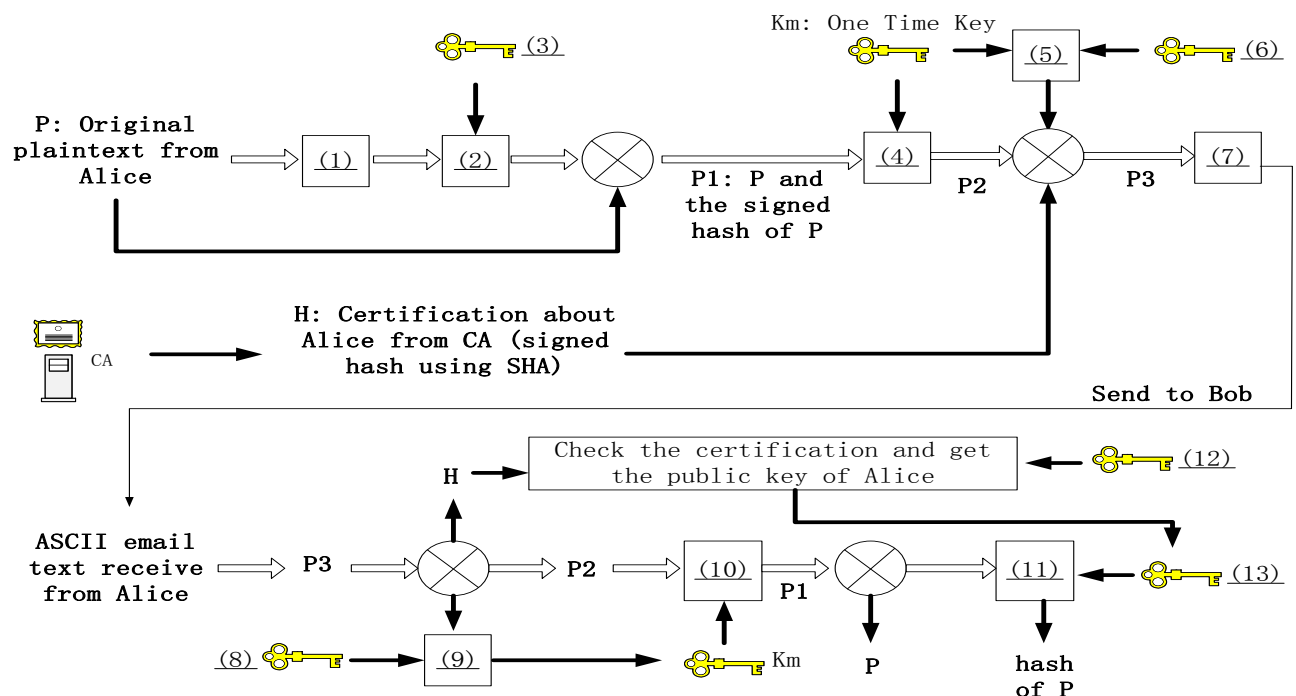
- 4、主机 A 向主机 B 发送 TCP 报文段，首部中的源端口是 m 而目的端口是 n。当 B 向 A 发送回信时，其 TCP 报文段的首部中的源端口和目的端口分别是什么？

答：分别是 n 和 m

Chapter8

V. Look the figure below, Alice wants to send a signed plaintext email P to Bob in a secure way. Both Alice and Bob have private and public RSA keys. Let us assume that each one don't know the other's public key, but they trust the same CA. So, Alice send her certification with the message to Bob, then Bob can get the public key of Alice, but Bob should check it before using the public key. Please select the right choice from following answers to complete the blank in the figure. (13 bonus)

- | | | |
|-------------------------------------|--------------------------------------|-----------------------------|
| A) the public key of Alice | B) the public key of Bob | C) the private key of Alice |
| D) the private key of Bob | E) the public key of CA | F) the private key of CA |
| G) the encryption algorithms of RSA | H) the encryption algorithms of IDEA | |
| I) the decryption algorithms of RSA | J) the decryption algorithms of IDEA | |
| K) the hash algorithms of MD5 | L) the encode algorithms of Base64 | |



思科资料

第一章 100

1.What is the hexadecimal equivalent of the binary number 11000011? //C3

- 2.What base number system uses only 1s and 0s? **//base 2**
- 3.Which command will verify internet connectivity? **//ping**
- 4.Which of the following describes the use of a network interface card (NIC)?
an adapter that connects a computer to network media
- 5.Which type of port interface transmits one bit at a time **///Serial port**
- 6.Which of the following is the decimal equivalent of the binary number 10110011?
//179
- 7.Which of the following is the binary equivalent of the decimal number 186
///10111010
- 8.Which of the following statements is true of ping? **//All of the above**
- 9.What is the hexadecimal number 0x2101 in binary? **///0010 0001 0000 0001**
- 10.What is the binary number 0010000100000000 in hexadecimal? **///0x2100**
11. What is the binary 11011010 in decimal? **///218**
- 12.What is the decimal number 151 in binary ? **////10010111**
- 13.What is the largest decimal value that can be stored in 1 byte? **////255**
- 14.Which number system is based on powers of 2? **////Binary**
- 15.The connection to the Internet can be broken down into which of the follow?连接网络需要通过下面的那些? **///All of the above 所有**
- 16.What is the main circuit board of a computer? 电脑的主要电路板是下面那个?
//Motherboard 主板
- 17.What are PCMCIA slots? 内存槽? **///Slots used primarily in laptops for expansion cards 内存扩充槽**
- 18.Which of the following is/are the resource(s) you need before you install a NIC? 你安装网卡之前需要哪些资源? **////All of the above**
- 19.What is a NIC? **///A printed circuit board that provides network communication**
20. All numbering systems have a beginning or first digit and an end or last digit. Select the first and last digits representing Base 16,hexadecimal **//十六进制的基本数字的第一(最后一)个数字是多少? 0/F**
- 21.Which of the following are situations that could require a technician to install a NIC?
a damaged network **connector in the PC 穿过网络连接 pc 机**
an upgrade from 10 mbps to 100mbps 将 10Mb 升级到 100Mb
the purchase of a new computer 购买一台新的电脑(BCF)

第二章 83

- 1.Why was the OSI model created?
to ensure that networks are compatible with each other 确保各种网络之间能通信
- 2.Joan works in the Boston office and needs to connect to the corporate network in Dallas. The type of information that Joan needs to access is very confidential and security is an issue. Which type of network should Joan use?
//SAN 存储区域网
- 3.Which of the following describes a LAN? 哪项是描述局域网的?
A network that connects workstations, switches, and other devices in a geographically limited area

4.Which of the following is used to describe the rated throughput capacity of a given network medium? 以下是用来描述一个给定网络中额定吞吐能力的？

///bandwidth 宽带

5.What is the topology if one central hub has four hubs connected to it, and each of those four hubs has four workstations attached?有一个集线器在中间，其他四个集线器**////An extended star 扩展星型**

6.What is/are the function(s) of a AAA server?/服务器的功能是什么？ **///All of the above**

7.What does a router route? 路由器的路线做什么？ **////Layer 3 packets 第三层包**

8.Which of the following is true of a switch's function?那一个是交换机的功能？

Switches combine the connectivity of a hub with the capability to filter or flood traffic based on the destination MAC address of the frame.

9.Which of the following is true of a bridge and its forwarding decisions?下列哪项是桥确定决策转发？

Bridges operate at OSI Layer 2 and use MAC addresses to make decisions.

10.Repeaters can provide a simple solution for what problem?中继器可以提供一些简单的解决问题？

Too much distance between nodes or not enough cable

11.In the TCP/IP model, which layer deals with reliability, flow control, and error correction? **//Transport**

12.Which of the following best defines encapsulation?那一项是最好的封装？

Wrapping data in a particular protocol header 在一个特定的协议头包装数据

13. An e-mail message is sent from Host A to Host B on a LAN. Before this message can be sent, the data must be encapsulated. Which of the following best describes what happens after a packet is constructed?

哪项是最好的定义数据发送结构或框架？

The packet is segmented into frames.将数据分割为帧

14.Which layer of the OSI model handles physical addressing, network topology, network access, and flow control? **///The data link layer 数据链路层（第二层）**

15.Which of the following is the correct order of the network layers?

1: Physical 2: Datalink 3: Network 4: Transport 5: Session 6: Presentation 7: Application

顺序为：物理层、数据链路层、网络层、链接层、会话层、表示层、应用层

16.The OSI model has how many layers?//OSI 有几层？ **////Seven**

17.What is the OSI model? **///All of the above**

18.What is the movement of data through layers?什么数据移动时穿过所有层 **////Encapsulation**

19.What is the name of the part of a company's LAN that is made available to select parties such as employees, customers, and partners? **///The extranet**

20. What links enterprise customer headquarters, remote offices, and branch offices to an internal network over a shared infrastructure? **/// Intranet VPN 企业**

内部网

- 21.What was the first type of microcomputer network to be implemented? **///LAN**
- 22.Using modem connections, how many modems would it take to allow connections from ten individual computers within the same location?**///Ten**
- 23.What is the information that is "burned in" to a network interface card? **///MAC address**
24. What service offers secure, reliable connectivity over a shared public network infrastructure?
什么服务网络安全，可靠？ ///Virtual private network 虚拟私人网
25. Which of the following is not one of the features of a SAN?下列哪项不是对存储局域网的描述
SANs minimize system and data availability.
- 26.Which of the following statements correctly describes a MAN?下列哪项正确陈述了城域网？
C.A MAN is a network that spans a metropolitan area such as a city or suburban area.
- 27.Which of the following statements best describes a WAN?
A.It connects LANs that are separated by a large geographic area.
- 28.What do TIA and EIA stand for?
Telecommunications Industry Association, Electronic Industries Alliance
- 29.Which topology has all its nodes connected directly to one center point and has no other connections between nodes? 那种拓扑结构连接到一个中心点节点和节点之间没有其他的连接？ **///Star**
- 30.WHAT is the purpose of VPN?虚拟私人网络的目的是什么？
secure connectivity 安全连接
connection to a private network through the internet 连接到转用网络的连接
- AC**
- 31.LANs are designed to do which of the following ?局域网是基于什么来设计的？
Operate within a limited geographic area 操作有限的物理区域
Allow many users to access high-bandwidth media 允许多个用户访问高带宽的
Provide full-time connectivity to local services 提供全日制连接本地服务 ABD

第三章 100

- 1.What is one advantage of using fiber optic cable in networks? 网络中使用光纤电缆的优势是什么？
It is capable of higher data rates than either coaxial or twisted-pair (双绞线) cable
他的传输速率比任何双绞线的的都快 你的答案:D
- 2.A fiber-optic (光纤) cable transmits multiple streams of LED-generated light. **///Multimode 多波形**
- 3.What does the twisting of the wires do in a twisted-pair cable?扭曲的双绞线做什么？
It reduces noise problems.减少了噪音问题 你的答案:C

4.What is an advantage that coaxial（同轴电缆线） cable has over STP or UTP?

It can run for a longer distance unboosted.在无推助器的情况下能跑的更快
你的答案:C

5.Which connector does UTP use? 非屏蔽双绞线用下列哪个连接? **///RJ-45** 你的答案:C

6.How many pairs of wires make up a UTP cable? 非屏蔽双绞线有几对金属丝?
///4 你的答案:B

7.What is the maximum cable length for STP? 环状网络最大的距离是多少? **///100 meters** 你的答案:D

8.Electrons flow in loops called_____. 循环电子流叫什么? **//Closed, circuits** 闭合, 电路。你的答案:D

9. Which of the following regarding electricity is untrue? **////None of the above.**
你的答案:D

10.What is the importance of the EIA/TIA standards（标准）? Select（选择） all that apply（使用）.

They provide guidelines for manufacturers to follow to ensure compatibility

They provide the minimum media requirements for multiproduct and multivendor environments.(BC)

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第四章 91

1.Using analog modem connections, how many modems would it take to allow connection from 10 computer? **////10** 你的答案:C

2.What was the first type of microcomputer network to be implemented?**///LAN** 你的答案:C

3.Which OSI layer is responsible for reliable data transport?**///Transport** 你的答案:A

4.At which OSI layer are file formats such as GIF,JPEG,and TIFF implemented?**///Presentation** 表示层//

5.Which best describe the structure of an encapsulated data packet?数据封装结构?

Frame header, network header, data, frame trailer 框架头部/网络头部/数据尾部/框架尾部

6.At which OSI layer does routing occur?路由在那层? **///Layer 3** 你的答案:B

7.Which data link sublayer communicates with the physical layer?**///Media Access control** 介质访问控制

8.With which OSI layer is the term frame associated?长期与 OSL 模型相连接的是哪个层? **//Data Link/**

9.With which OSI layer is the term packet associated? 那层合作将数据打包
///Network 网络层

10.At which OSI layer can FTP and SMTP be found? 那层能用传输文件?
///Application 应用层

11.Which OSI 11.layer defines physical addressing? 那层定义的 OSL 的物理地址
//Data Link

12.Which OSI layer is responsible for logical addressing?那层定义的 OSL 的逻辑地址
///Network

13.Which OSI layer defines voltage levels, maximum transmission distance ,and

physical connectors?

那一层用来通过最大传输距离来物理连接? **Physical** (物理层通过线来连接网络的, 如: 光纤, 双绞线) 你的答案:C

14.Which OSI layer is the first layer to process information from a transmitting computer?

那一层用来处理计算机信息的? **Application** 应用层 你的答案:D

15.Which organization developed the OSI model?哪个组织定义的 OSI 模型? **ISO** 你的答案:B

16.At which layer of the OSI model do transparent bridges operate?桥操作在那一层?

Layer 2 (Data Link) 17.What is an adjustable amount of data that can be sent

without an acknowledgement?**Windowing** 18.Sequencing acknowledgments, and follow control are characteristics of which OSI layer?

顺序发送, 根据那层? **Layer 4 (Transport)**传输层 你的答案:A

19.At which layer of the OSI model does NetBIOS operate?**Layer 5(Session)** 你的答案:B

20.What is a name for a type of RAM in a Cisco router? 思科路由器在随机存储类型的名字叫什么?

DRAM 动态分配**Read Active Memory** 你的答案:A

21.Which of the following represents 172.30.16.254 in binary format?**None of these** 你的答案:D

22.What is the decimal number 151 in binary ? **10010111** 你的答案:B

23.Which numbering system is based on power of two?哪一个编号系统是基于 2 为权的? **Binary**

24.Which of the following represents 203.128.56.10 in binary format?//

11001011.10000000.00111000.00001010

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第五章 100

1.What type of cable is used to connect a terminal and a console port?

什么类型的电缆用于连接终端和控制端口? **Rollover** 反转线 你的答案:B

2.What type of connector is used to connect a router and a cable system?

什么类型的控制设备用来连接路由器和电缆系统的? **F** 用在控制端口和交换机连接上 /

3.What type of connector is used for DSL (数字用户回路。主要用在电话上) connection?

什么类型的连接用来做数字用户控制? **RJ-11** 用在电话线上, 快带连接。你的答案:B

4.Which of the following media is used to interconnect the ISDN BRI port to the service provider device?

下列媒体是用来连接 ISDN 端口到服务器提供商的设备是? **CAT 5UTp straight-thought** 你的答案:A

5.What best describes DCE?描述数据通信最好的是?

Devices that make up the network end of the user-to-network interface 你的答案:D

6.What type of data-transmission method is used by a WAN?什么用的数据传输方法的类型是使用一个广域网? ///Serial 连续的 你的答案:B

7.Which of the following is not a WAN implementation ?那一项不是广域网完成的内容? //Ethernet 8.Which technology is not type of type wireless communication?那种类型不是通过无线通信连接的?

broadband 宽带 你的答案:B

9.For which of the following would you not need to provide a crossover cable?连接什么不需要交叉线?

connecting routes to switches

10.Which of the following statements does not correctly describe a media connector?下列哪项是不正确的描述了媒体的连接方式?

An RJ-45connector is an 8-pin connector used mainly for terminating coaxial cable.你的答案:A

11.Which standards body created the cables and connector specification used to support Ethernet implementation ? ///EIA/TIA 你的答案:C

12.Which of the following is the most appropriate choice for Ethernet connectivity?根据下列选择最好的连接局域网?

Use Fast Ethernet as a link between the user level and network devices to support the aggregate traffic from each Ethernet segment on the access link 你的答案:C

13.Which of the following is an 802.3u specification//100base-tx 你的答案:C

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第六章 100

1.Which is true of a deterministic MAC protocol?哪项确定 MAC 协议?

It allows the hub to “take turns” sending data.你的答案:C

2.Which is an important Layer 2 data link layer function?数据链路层的功能? ///All of the above

3.In an Ethernet or IEEE 802.3 LAN, when do collisions occur?在 IEEE802.3 局域网中什么时候发生碰撞?

When two stations listen for traffic, hear none, and transmit simultaneously

4.Which best describes a CSMA/CD network?

One node’s transmission traverses the entire network and is received and examined by every node.

5.Media Access Control refers to what?媒体介质控制属于哪类?

Rules that determine which computer on a shared-medium environment is allowed to transmit the data

6.Which functions are associated with framing?///All of the above.你的答案:D

7.Which of the following statements best describes communication between two devices on a LAN?

The source device encapsulates data in a frame with the MAC address of the destination device and then transmits it. Everyone on the LAN sees it, but the devices with nonmatching addresses otherwise ignore the frame. 你的答案:A

8.Where does the MAC address reside?物理地址在哪里? **///NIC** 当然是网卡啦
你的答案:C

9. What is the name of the access method used in Ethernet that explains how Ethernet works?**///CSMA/CD** 10.MAC addresses are how many bits in length? MAC 地址位长是多少? **///48**

11.What do the first six hexadecimal numbers in a MAC address represent?MAC 地址前 6 位是用来做什么的? **///Organizationally unique identifier** 组织唯一标识符
你的答案:B

12.The recognized IEEE 802.3 sublayers are concerned with what layers of the OSI reference model?**///1 and 2** 13.Which of the following is not one of the recognized IEEE sub layers?**///Data Link Control** 你的答案:B

14.The LLC, as a sub layer , participates in which process?数据链路层参与了那个过程
? **///Encapsulation**

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第八章 100

1.Which of the following is used by LAN switches for making the forwarding decision?

下列那一项是交换机所作出的转发决定?

MAC address 很明显是交换机是通过 **MAC** 来决定转发的 你的答案:B

2.Which of the following is a feature of full-duplex transmission?**///All of the above. /**

3.The process of using the complex networking devices, such as bridges, switches, and routers, to break up the collision domains is known as which of the following?

Segmentation 是用 **switch** 、 **router** 、 **bridge** 这些设备就是将网络分割成很多段小网络。

4.Using repeaters does which of the following to the collision domain?

Extends 你的答案:C

5.What is a network area called where two or more Ethernet stations are separated by a bridge or Layer 2 switch , in which data frames originate and collide?

Collision domain 你的答案:A

6.Which of the following is true for LAN switches?

They are very high-speed multiport bridges. 你的答案:B

7.Which of the following statements is true of microsegmentation?

Each workstation gets its own dedicated segment through the network. 你的答案:A

8.which of the following is true concerning a bridge and its forwarding decision?

网桥通过什么来决定转发的?

Bridges operate at OSI Layer 2 and use MAC addresses to make decision. 当然是物理地址了。

9.Which of the following is not one the STP port states?///**Transmitting 传输层** 10.The Spanning Tree Protocol allows which of the following?STP 服务器是允许下列那个?

A redundant Layer 2 network path without suffering the effects of loops in the network 你的答案:B

11.Which of the following is not a feature of micro segmentation?
下列哪项不是为分割功能?

It increases collision.容易增加冲突。说 TMD 啊,分割本就是为了减小冲突。
你的答案:D

12. Which of the following is a feature of bridges? 下列哪项是桥的特色?

They operate at Layer 2 of the OSL model.操作在第二层

They are more intelligent than hubs.比集线器更聪明

They build and maintain address tables 他们创建和维护地址表 ABD

13. Which OSI layers are considered part of the lower, or data, transport layers?

///Transport 传输层 Physical 物理层 AD

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第九单元

1.Which of the following is one of the protocols found at the transport layer? ///**UDP**
用户数据报协议 2.Which of the following is not a function of the network layer?

UDP provides connectionless exchange of datagrams without acknowledgments. 你的答案:D

3.The TCP/IP protocol suite has specifications for which layers of the OSI model?
TCP 与 OSI 模型那几层相同?

3,4,and 5 through 7 你的答案:C

4.Which of the following does not describe the TCP/IP protocol stack? 下列哪项不是 TCP/IP 功能的描述?

It maps closely to the OSI reference model's upper layers.

工作在 OSL 上层。(他本来就和 OSL 相同,怎么能工作在他上层呢?)你的答案:A

5.Which of the following best describes TCP/IP?

It is a suite of protocols that can be used to communicate across any set of inter connected networks.

这是一个可以被用来通过任何通信连接的网络协议套件 你的答案:A

6. Why are current, updated ARP tables important? 地址解析协议最总要是数据更新为什么?

For limiting the number of broadcasts 防止广播风暴 你的答案:B

7.Which of the following best describes the ARP reply?

A device sends its MAC address to a source in response to an ARP request

一个设备发送响应他的 MAC 地址的请求源 你的答案:A

8.Which of the following best describes an ARP table ?

A way to reduce network traffic by providing lists of shortcuts and routes to common destinations

通过路由来选择最短的路径,以共同的目录地址网络通信。你的答案:A

9.Which of the following initiates an ARP request? 下列哪项是 ARP 发起的请求?

A device that can locate the destination IP address in its ARP table 你的答案:D

10.What internet protocol is used to map a known IP address to an unknown MAC address?

ARP 你的答案:C

11.What are the two parts of an IP address? //**network address and host address** 你的答案:A

12.If a device doesn't know the MAC address of a device on an adjacent network, it sends an ARP request to what? ARP 不知道我们的 MAC 地址时, 他发出的请求有哪些? //**The default gateway** 默认网关

13.How does the network layer forward packets from the source to the destination? //

by using a routing table 通过使用一个路由表 你的答案:A

14.What is the first thing that happens when a DHCP client boots ///**DHCPDISCOVER**
DHCP discover

15.Which of the following protocols operate at the TCP/IP Internet layer? ///**ALL of the above** 你的答案:D

16.which of the following is a basic of the transport layer///**All of the above** 你的答案:D

17.what transport layer protocol does TFTP use? ///**UDP** 你的答案:C

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第十单元

1.Which of the following describes an autonomous system?

set of network under common administration. 你的答案:C

2.Why does a router perform a logical "ANDing"?

to determine the network or subnetwork to which a 你的答案:C

3.How many host bits are available in the subnet mask 255.255.248.0? ///**11** 你的答案:C

4.Which of the following best describes the function of a route?

A router forwards packets form one network to anot 你的答案:D

5.which of the following describes dynamic routing?

It automatically adjusts to changing network condi 你的答案:B

6.What are the two part of a network layer address that routers use to forward traffic through a network?

Network address and host address. 你的答案:A

7.How does the network layer forward packets from the source to the destination?

By using an IP routing table. 你的答案:A

8.What function allows routers to available routes to a destination and to establish the preferred handling of a packet? ///**Path determination** 你的答案:B

9.Which of the following best describes one function of Layer 3,the network layer in the OSI model?

It determines which is the best path for traffic t 你的答案:C

10.Performing the Boolean function as a router would on the IP addresses 172.16.2.120 and 255.255.255.0,what is the subnet address? ///**172.16.2.0** 你的

答案:C

11.With a Class C address of 197.15.22.31 and a subnet mask of 255.255.255.224,how many bits have been borrowed to create a subnet? **3** 你的答案:C

12.Performing the Boolean function as router would on the IP addresses 121.8.2.5 and 255.0.0.0, what is the network/subnetwork address? **None of the above** 你的答案:D

13.How many bits are in a subnet mask? **32** 你的答案:B

14.What is the primary for using subnets? **To reduce the size of the collision domain.** 你的答案:A

15.What is the minimum number of bits that can be borrowed to from a subnet? **2** 你的答案:B

16.How many host addresses can be used in a Class C network? **254** 你的答案:B

17.Which of the following addresses is an example of a broadcast address on the network 123.10.0.0 with a subnet mask of 255.255.0.0? **123.10.255.255** 你的答案:B

18.What portion of the IP address 129.219.51.18 represents the network? **129.219** 你的答案:A

19.What portion of the Class B address 154.19.2.7 is the network address?**154.19** 你的答案:B

20.Convert the binary IP address 11000000.00000101.00100010.00001011 to its decimal form. **190.4.34.11**

190.4.34.11

21.Convert the decimal number 192.5.34.11 to its binary from.

11000000.00000101.00100010.00001011 你的答案:A

22.The host number plays what part in an IP address?

It designates which node on the subnetwork is bein 你的答案:B

23.What is the decimal equivalent of the binary number 101101? **45** 你的答案:C

24.The network number plays what part in an IP address?

It specifies the network to which the host belongs 你的答案:A

25.What is maximum value of each octet in an IP address? **255** 你的答案:B

26.How many bits are in an IP address? **32** 你的答案:B

27.Determine the IP address that are useable for hosts on the subnetwork of the 200.100.50.0/28 network.. Not useable for host address (Choose four)

200.100.50.80 //200.100.500.143 //200.100.50.208
//200.100.50.79 ACDF

28.Determine the IP address that are useable for hosts on the subnetwork of the 200.100.50.0/28 network. . Useable for host address (Choose four)

200.100.50.25 //200.100.50.100 //200.100.50.170
//200.100.50.90 ACEF

29.Which of the following are parts of an IP packet header?(Choose three)
///TTL//padding//flags//ADE

第十一单元

1.Instead of working with specific application programs, redirectors work with which of the following?

Computer operating systems

2.The typical default settings for anonymous FTP sessions use _____ as the login id and _____ as the password . **//Anonymous: the use E-mail address**

3.At which three layers of the OSI model does Telnet primarily work?//

Application layer, presentation layer,session layer

4.During a telnet connection, the remote computer is responsible for which of the following?//**Processing**

5..com is the domain typically assigned to which of following?//**Corporations**

6.Which of the following best describes a domain name? **It translates the name of a network node into a number**

7.The client side of the client/server relationship is which of the following? **//The requestor of servers**

8.Which of the following is an example of a client/server application? **//E-mail**

9.A network redirector enables data to travel _____? **///None of the above**

10.UDP segments use what protocols to provide reliability? **//Application layer protocols**

11.What does a dynamic TCP window field do? **//It allows the window size to be negotiated dynamically**

12.What is the purpose of port numbers? **//They keep track of different upper-layer conversations**

13.Which of the following is one of the protocols found in the transport layer? **//UDP**

14.Which of the following best describes the purpose of the TCP/IP protocol stack?

Transfers information from one host to another in a reliable manner

15.Which best describes flow control? **//A method of preventing buffer overrun**

16.With TCP transmission, what occurs if a segment is not acknowledged in a certain time period?

Retransmission occurs

17.Which range of port numbers is unregulated? **//Above 1023**

18.How does TCP synchronize a connection between the source and the destination before data transmission? **///Three-way handshake**

19.What do TCP and UDP use to keep track of different conversations crossing a network at the same time?

Port Numbers

20.What transport protocol exchanges datagrams without acknowledgements or guaranteed delivery?//**UDP**

21.When conversing with an individual whose primary language is different than yours, and might need to repeat your words and speak more slowly. Repeating your words can be compare to _____,And the need to speak slowly can be compare to the _____ functions of transport layer. **//Reliability; flow control**

22.The following characteristics describe what TCP/IP protocol; connection-oriented; resends anything not received; divides outgoing messages into segments? **//TCP**

23.What does the window field in a TCP segment indicate?/**Number of octets that the device is willing to accept**

24.Why are TCP three-way hand shake/open connections used? Select all that apply.

To ensure that lost data can be recovered if problem occurs

To determine how much data the receiving station can accept

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