Two Questions

C

4. Which is an application layer protocol? _____

A. IP   B. TCP   C. DNS   D. ICMP

B

8. An e-mail message contains the _____ and the _____.

A、 header; envelop

B、 header; body

C、 envelop; body

D、 None of the choices are correct

One-choice question

1. A _____?_____ is a device that forwards packets between networks by processing the routing information included in the packet.

(a) bridge   (b) firewall   (c) router   (d) hub

C

One-choice question

2. Network congestion occurs _____

a) in case of traffic overloading
b) when a system terminates
c) when connection between two nodes terminates
d) in case of transfer failure

a

One-choice question

3. Which layer is responsible for process to process delivery in a general network model?

a) network layer
b) transport layer
c) session layer
d) data link layer

b

One-choice question

4. The value of acknowledgement field in a segment defines _____
a) sequence number of the byte received previously
b) total number of bytes to receive
c) sequence number of the next byte to be received
d) sequence of zeros and ones

C

One-choice question

5. In the slow-start algorithm, the size of the congestion window increases _____ until it reaches a threshold.

a) exponentially
b) additively
c) multiplicatively
d) suddenly

a

Answer the question

1. We noted that network layer functionality can be broadly divided into data plane functionality and control plane functionality. What are the main functions of the data plane? Of the control plane?

Answer the question

R2、数据平面的主要功能是转发数据包，转发数据报从它们的输入链路到它们的输出链路。例如，数据平面输入端口执行终止传入物理链路的物理层功能在路由器处，执行链路层功能以在另一个路由器上与链路层互操作传入链路的一侧，并在输入端口上执行查找功能。

控制平面的主要功能是路由，即确定数据包从源到目的地的路径。控制平面负责执行路由协议，响应连接的上下链路，与远程控制器通信，并执行管理功能。

Answer the question

2. Give an example showing why a network operator might want one class of packets to be given priority over another class of packets.

R15、例如，携带网络管理信息的分组应当接收优先于常规用户流量。另一个示例是实时语音IP分组可能需要在非实时流量（如电子邮件）上接收优先级。

Answer the question

3. What is HOL blocking? Does it occur in input ports or output ports?

R13、HOL阻塞：有时在输入端口队列中首先排队的数据包必须必须等待，因为它想要的输出端口没有可用的缓冲区空间被转发。当发生这种情况时，第一分组后面的所有分组被阻塞，即使它们的输出队列具有容纳它们的空间。发生HOL阻塞发生在输入端口处。
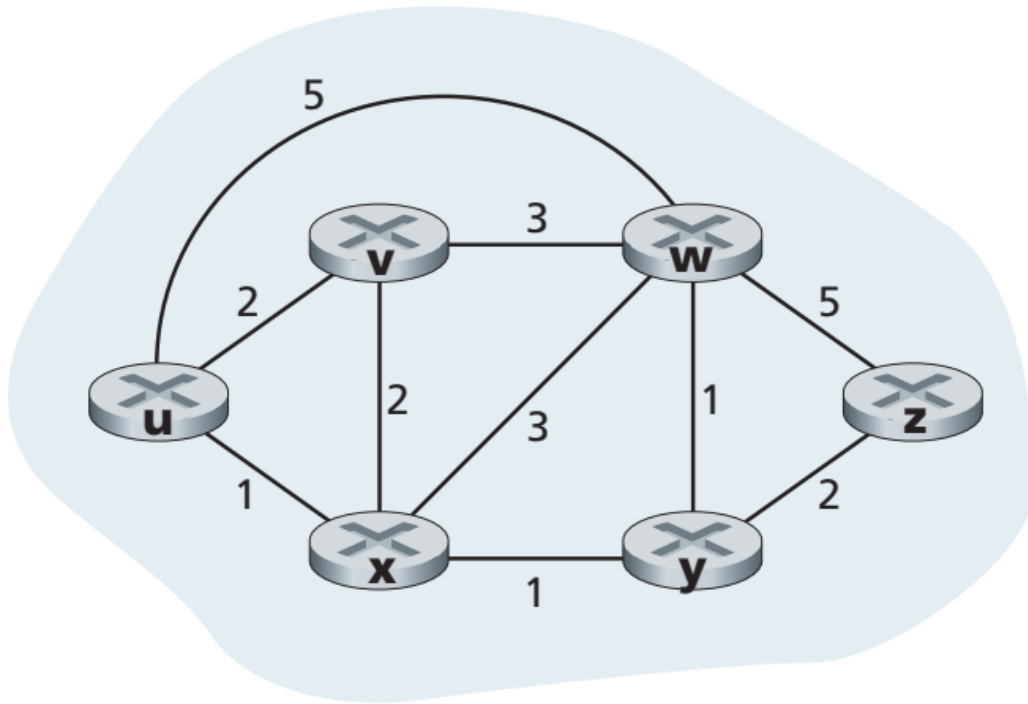
Answer the question

Fig. 1

P1. Looking at Figure 1, enumerate the paths from *y* to *u* that do not contain any loops.

P2. Repeat P1 for paths from *x* to *z*.

Answer the question
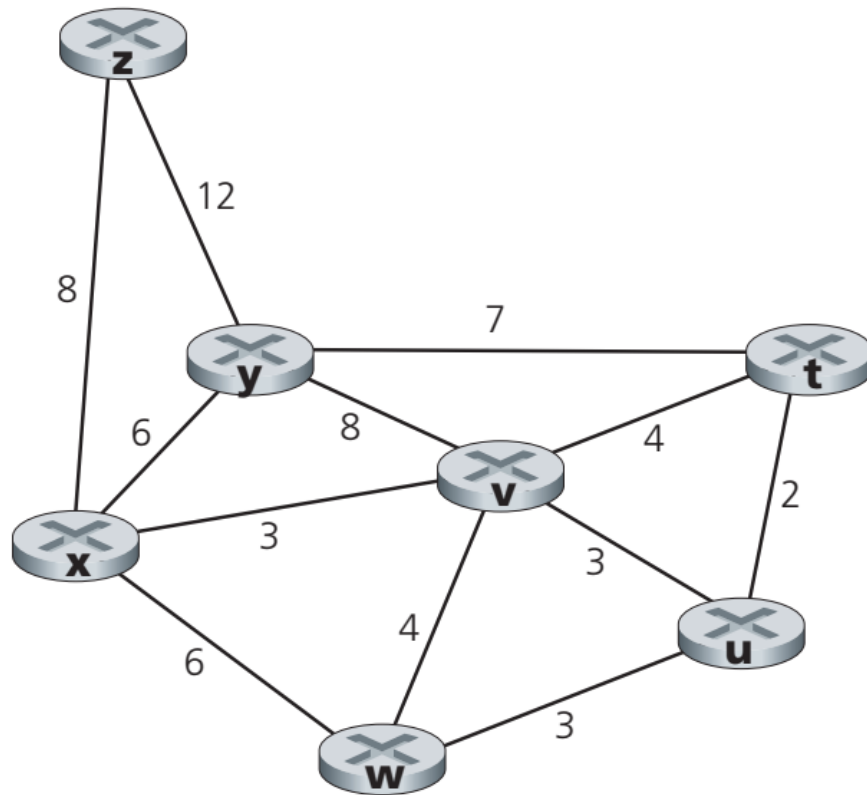

Fig. 2

P3. Consider this network (Fig. 2). With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from *x* to all network nodes. Show how the algorithm works by computing a table similar to Table 5.1.

Q1.

Which is an application layer protocol?（   ）

A. IP
B. TCP
C. DNS
D. ARP

WHY?

Q2.

If the subnet mask is 255.255.224.0, which of the following IP addresses is not in the same network as other addresses (   )?

A. 172.25.5.200
B. 172.25.15.200
C. 172.25.25.15
D. 172.25.35.15

D

Q3.

___?____ is a protocol used to provide quick, automatic, and central management for the distribution of IP addresses within a network. It is also used to configure the proper subnet mask, default gateway, and DNS server information on the device.

DHCP

Q1.

The computation of the shortest path in OSPF is usually done by （　　）

a) Bellman-ford algorithm
b) Routing information protocol
c) Dijkstra's algorithm
d) Distance vector routing

Q2.

In a five-layer Internet protocol stack, which layer provides reliable end-to-end data transfer service?（　　）

A. transport layer
B. network layer
C. application layer
D. link layer

Q3.

The units of data exchanged by a network layer protocol are called _____

A. frames
B. segments
C. datagrams
D. bit streams

Q4.

What is the subnet id of a host with an IP address 172.16.66.0/21?（　　）

A. 172.16.36.0
B. 172.16.48.0
C. 172.16.64.0
D. 172.16.0.0

WHY?

Q5.

How many usable IP addresses are available on the 203.0.116.0/27 network?（　　）

A. 128
B. 64
C. 32
D. 30

WHY?

Q6.

The core of the SDN framework is（   ）

A. Control unit
B. Server
C. Memory
D. Arithmetical Unit

Q7.

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

Q8.

A technician can ping the IP address of the web server of a remote company but cannot successfully ping the URL address of the same web server, which of the following is not set properly?（　　）

A. IP address
B. subnet mask
C. default gateway
D. DNS

WHY?

One question (Bonus: one point)

- The most commonly used Email protocols on the internet are: POP3, IMAP and _____ .

- **Answer：SMTP**

2 questions

1.____DNS____is a directory service that translates hostnames to IP addresses.

2. HTTP uses the services of ___B_?_____.

A. UDP

B. TCP

C. IP

D. DNS

There are two 16-bit integers: 1110 0110 0110 0110, 1101 0101 0101 0101. Their checksum is (A).

A. 0100010001000011
B. 1011101110111100
C. 1111111111111111
D. 1000000000000000

Which of the following is false with respect to UDP? (   ).

A. Connection-oriented
B. Unreliable
C. Transport layer protocol
D. Low overhead

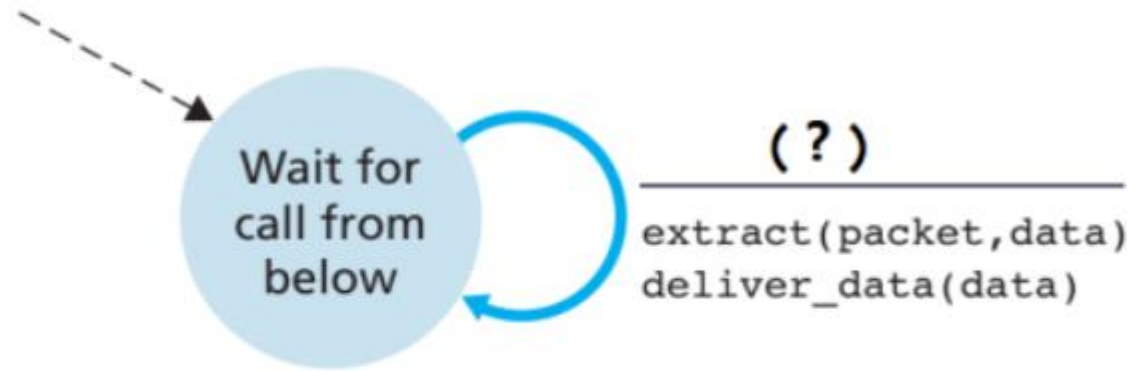**Which of the following is false with respect to UDP? (   ).**

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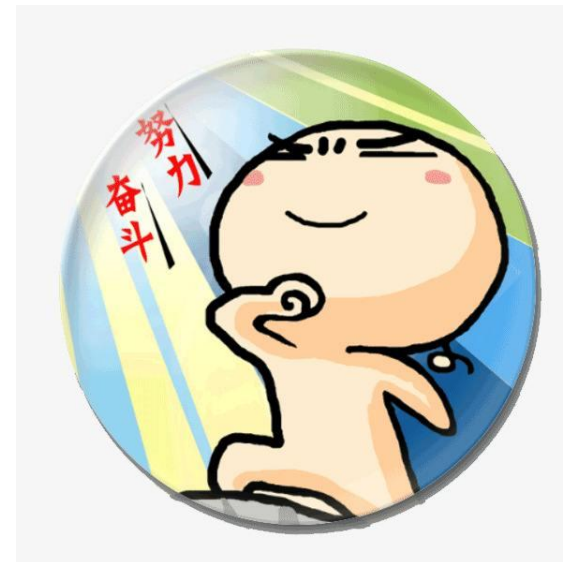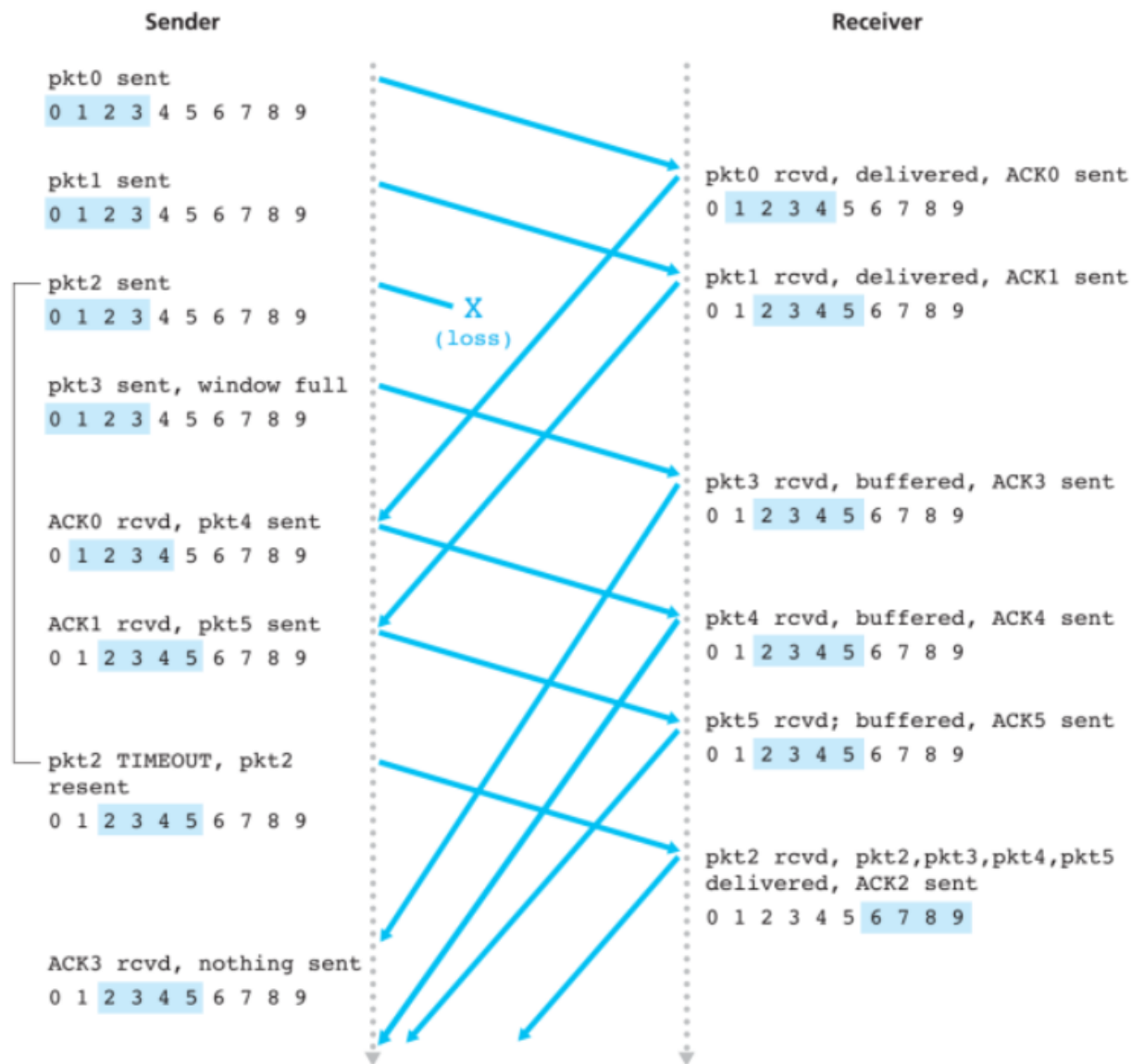9. In RDT1.0 model

(?)

extract(packet,data)
deliver_data(data)

rdt1.0: receiving side

A. rdt_send (data)

B. udt_send (packet)

C. rdt_rcv (packet)

D. udt_rcv (packet)

C

The following figure describes which protocol runs instance?   (   )

Sender

pkt0 sent
0 1 2 3 4 5 6 7 8 9

pkt1 sent
0 1 2 3 4 5 6 7 8 9

pkt2 sent
0 1 2 3 4 5 6 7 8 9

pkt3 sent, window full
0 1 2 3 4 5 6 7 8 9

ACK0 rcvd, pkt4 sent
0 1 2 3 4 5 6 7 8 9

ACK1 rcvd, pkt5 sent
0 1 2 3 4 5 6 7 8 9

pkt2 TIMEOUT, pkt2
resent
0 1 2 3 4 5 6 7 8 9

ACK3 rcvd, nothing sent
0 1 2 3 4 5 6 7 8 9

X
(loss)

Receiver

pkt0 rcvd, delivered, ACK0 sent
0 1 2 3 4 5 6 7 8 9

pkt1 rcvd, delivered, ACK1 sent
0 1 2 3 4 5 6 7 8 9

pkt3 rcvd, buffered, ACK3 sent
0 1 2 3 4 5 6 7 8 9

pkt4 rcvd, buffered, ACK4 sent
0 1 2 3 4 5 6 7 8 9

pkt5 rcvd; buffered, ACK5 sent
0 1 2 3 4 5 6 7 8 9

pkt2 rcvd, pkt2,pkt3,pkt4,pkt5
delivered, ACK2 sent
0 1 2 3 4 5 6 7 8 9

A. Stop-and-wait   B. Selective-repeat   C. Go-Back-N   D. All of the above protocols are possible

10. Transport layer protocols deals with

A. application to application communication

B. process to process communication

C. node to node communication

D. none of the mentioned

B

The UDP header has only_____ fields.

A. 2   B. 3

C. 4   D. 5

C

9. User datagram protocol is called connectionless because _____

A. it is received in the same order as sent order

B. it sends data as a stream of related packets

C. all UDP packets are treated independently by transport layer

D. none of the mentioned

C

True or False 1

a. Host A is sending Host B a large file over a TCP connection. Assume Host B has no data to send Host A. Host B will not send acknowledgments to Host A because Host B cannot piggyback the acknowledgments on data.

B需要发送ACK报文，只是该报文不会再数据段携带数据

F

True or False 2

b. The size of the TCP `rwnd` never changes throughout the duration of the connection.

rwnd的值会每隔一段时间探测并更新

F

True or False 3

c. Suppose Host A is sending Host B a large file over a TCP connection. The number of unacknowledged bytes that A sends cannot exceed the size of the receive buffer.

T

True or False 4

d. Suppose Host A is sending a large file to Host B over a TCP connection. If the sequence number for a segment of this connection is m, then the sequence number for the subsequent segment will necessarily be $m + 1$.

F

True or False 5

e. The TCP segment has a field in its header for `rwnd`.

T

True or False 6

f. Suppose that the last `SampleRTT` in a TCP connection is equal to 1 sec. The current value of `TimeoutInterval` for the connection will necessarily be ≥ 1 sec.

超时时延的计算是比较复杂的，是一个比较平稳的值。未必大于SampleRTT(SampleRTT波动性可能很大)。

F

的超时计时器的超时重传时间究竟应设置为多大呢？

TCP 采用了一种自适应算法，它记录一个报文段发出的时间，以及收到相应的确认的时间。这两个时间之差就是报文段的往返时间 RTT。TCP 保留了 RTT 的一个加权平均往返时间 RTT_S（这又称为平滑的往返时间，S 表示 Smoothed。因为进行的是加权平均，因此得出的结果更加平滑）。每当第一次测量到 RTT 样本时，RTT_S 值就取为所测量到的 RTT 样本值。但以后每测量到一个新的 RTT 样本，就按下式重新计算一次 RTT_S：

$$新的 RTT_S = (1 - \alpha) \times (旧的 RTT_S) + \alpha \times (新的 RTT 样本) \tag{5-4}$$

在上式中，$0 \leq \alpha < 1$。若 α 很接近于零，表示新的 RTT_S 值和旧的 RTT_S 值相比变化不大，而对新的 RTT 样本影响不大（RTT 值更新较慢）。若选择 α 接近于 1，则表示新的 RTT_S 值受新的 RTT 样本的影响较大（RTT 值更新较快）。已成为建议标准的 RFC 6298 推荐的 α 值为 1/8，即 0.125。用这种方法得出的加权平均往返时间 RTT_S 就比测量出的 RTT 值更加平滑。

显然，超时计时器设置的超时重传时间 RTO（RetransmissionTime-Out）应略大于上面得出的加权平均往返时间 RTT_S。RFC 6298 建议使用下式计算 RTO：

$$RTO = RTT_S + 4 \times RTT_D \tag{5-5}$$

而 RTT_D 是 RTT 的偏差的加权平均值，它与 RTT_S 和新的 RTT 样本之差有关。RFC 6298 建议这样计算 RTT_D。当第一次测量时，RTT_D 值取为测量到的 RTT 样本值的一半。在以后的测量中，则使用下式计算加权平均的 RTT_D：

$$新的 RTT_D = (1 - \beta) \times (旧的 RTT_D) + \beta \times |RTT_S - 新的 RTT 样本| \tag{5-6}$$

True or False 7

g. Suppose Host A sends one segment with sequence number 38 and 4 bytes of data over a TCP connection to Host B. In this same segment, the acknowledgment number is necessarily 42.

acknowledgment number是与对方的序列号向对应的。
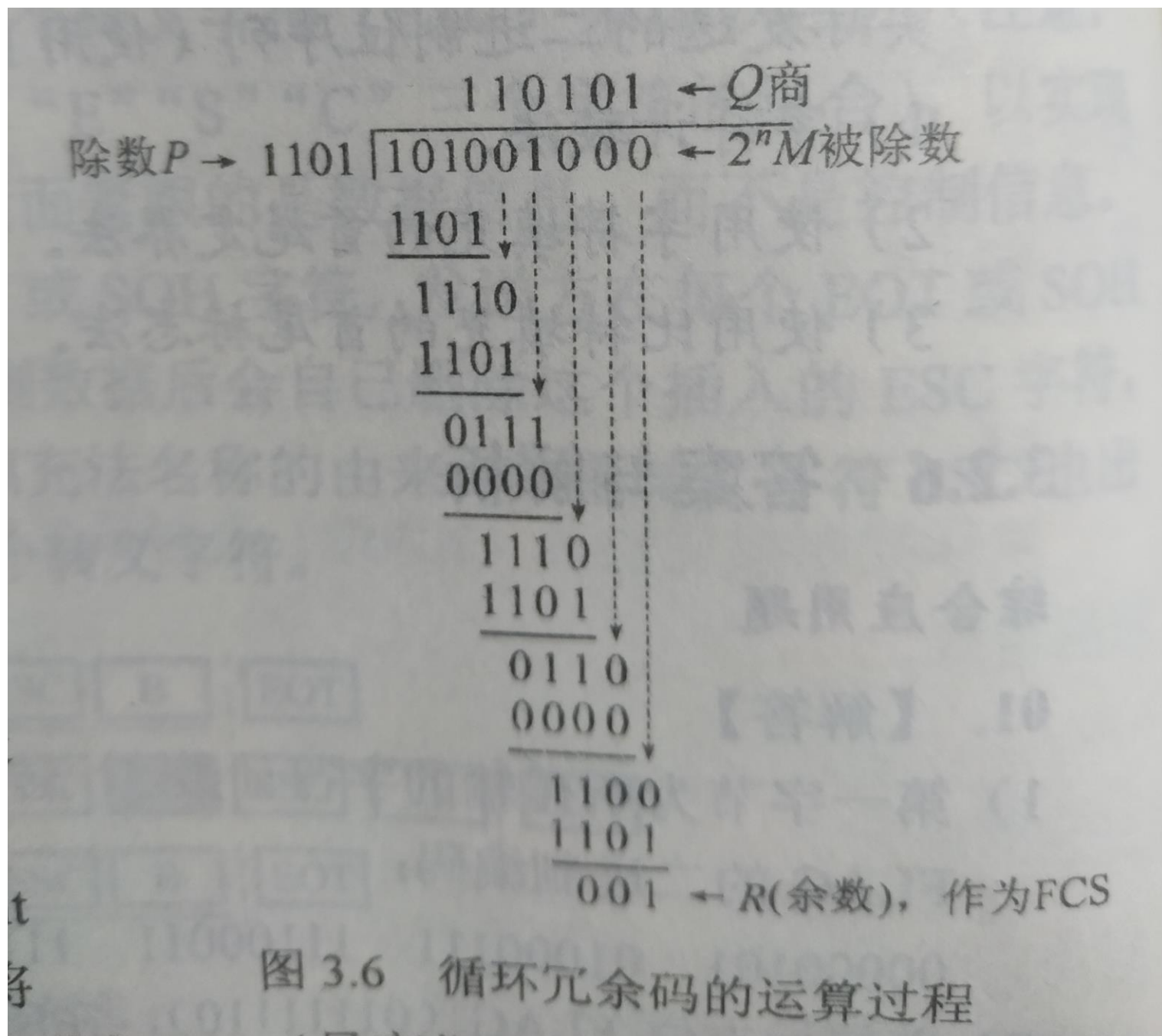acknowledgment number=n,说明期待对方的下一个报文的序列号是n

F

Q1.

Consider the 4-bit generator, G = 1011, and suppose that D has the value 101010. What is the value of R?
(   )

R=001

Q1.

$$
\begin{array}{r}
110101 \leftarrow Q商 \\
除数 P \rightarrow 1101\ \overline{)\ 101001000} \leftarrow 2^n M 被除数 \\
\underline{1101} \\
1110 \\
\underline{1101} \\
0111 \\
\underline{0000} \\
1110 \\
\underline{1101} \\
0110 \\
\underline{0000} \\
1100 \\
\underline{1101} \\
001 \leftarrow R(余数),作为 FCS
\end{array}
$$

图 3.6 循环冗余码的运算过程

Q2.

Consider the 3-bit generator, G = 101, and suppose that D has the value 10001. What is the value of R?
(   )

R=00

Q1.

10. You have an IP address of 172.16.13.5 with a 255.255.255.128 subnet mask. What is your subnet address, and broadcast address?

   A. Subnet 172.16.13.0, Broadcast address 172.16.13.127

   B. Subnet 172.16.13.0, Broadcast address 172.16.13.128

   C. Subnet 172.16.13.0, Broadcast address 172.16.13.255

   D. Subnet 172.16.0.0, Broadcast address 172.16.255.255

Q2.

4. ICMP is primarily used for _____

A. error and diagnostic functions

B. addressing

C. forwarding

D. routing

Q1.

What protocol is responsible for controlling the size of segments and the rate at which segments are exchanged between a web client and a web server?（　　）

A. TCP
B. IP
C. HTTP
D. Ethernet

A

Q2.

Ethernet frame consists of _____
a) MAC address
b) IP address
c) Default mask
d) Network address

A

Q3.

The required resources for communication between end systems are reserved for the duration of the session between end systems in _____ method.

a) Packet switching
b) Circuit switching
c) Line switching
d) Frequency switching

B

Q4.

The maximum transmission unit (MTU) of Ethernet is _____ bytes

A. 60   B. 1000   C. 1500   D. 2000

C

Q5.

Which of the following characteristics is not suitable for fiber optics?

A. immune to electromagnetic interference
B. very low signal attenuation
C. long distance transmission
D. easy to tap

D

Q6.

Hub is a device at the _____ layer.

A. physical layer
B. link layer
C. network layer
D. transport layer

A

Q7.

The multiple access protocol Ethernet adopts is _____.

A. Token-Ring
B. CDMA
C. CSMA/CD
D. CSMA/CA

C

Q8.

What addresses are mapped by ARP? _____.

A. destination MAC address to a destination IPv4 address
B. destination IPv4 address to the source MAC address
C. destination IPv4 address to the destination host name
D. destination MAC address to the source IPv4 address

A

Q1.

When a DHCP client initiates its IP address, it will broadcast _____ message to local subnet.

A. DHCP DISCOVER   **B. DHCP REQUEST**

C. DHCP OFFER   **D. DHCP ACK**

A

Q2.

What does data link layer use to find hosts on a local network?

A. Logical network addresses
B. Port numbers
C. Hardware addresses
D. Default gateways

C

Q3.

Which of the following is the considered when designing a network protocol?

A. security
B. legal
C. efficiency
D. all of the above

D

Q4.

Where should we use default routing?

A. On local networks which have only one exit path out of the network

B. Which have more than one exit path out of the network

C. Minimum five exit paths out of the network

D. Maximum five exit paths out of the network

A

Q5.

Which kind of media is not a guided media? ( )

A. twisted-pair copper wire
B. a coaxial cable
C. fiber optics
D. satellite channel

D

Q6.

In CSMA/CD, after the fifth collision, what is the probability that a node chooses $K = 8$? (   )

A. 1/4
B. 1/8
C. 1/16
D. 1/32

D

Q7.

A router is a ___?____-layer device, and switches are ___?____-layer devices.

NETWORK, LINK

Q8.

We can classify just about any multiple access protocol as belonging to one of three categories. ALOHA belongs to ___?_____protocol. Polling belongs to ____?____ protocol.

RANDOM ACCESS, TAKING-TURNS

Q9.

Inside the data center, the external requests are first directed to a ____?_____whose job it is to distribute requests to the hosts, balancing the load across the hosts as a function of their current load.

load balancer

Q10.

The most obvious technique for achieving broadcast is a ___?_____approach in which the source node sends a copy of the packet to all of its neighbors.

flooding
洪泛

Q1

List the three categories of multiple access protocols, and describe at least two typical techniques introduced in each type.