

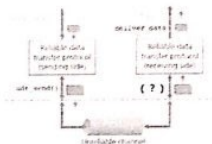
考试课程		考试日期	2018 年 6 月 日	成绩	
课程号		教师号		任课教师姓名	徐明、史本云、邱洪君、伍益明
考生姓名		学号 (8 位)		年级	专业

注: 所有答案请写在答卷纸上

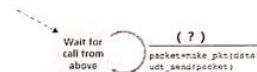
Please Answer in Chinese or in English or Bilingualism!!

Part One. Multiple choice (单选题), one point per question, total of 20 points

- The IETF standards documents are called \_\_\_\_\_.  
A. RFC B. RCF C. ID D. None of the mentioned
- Suppose users share a 2 Mbps link. Also suppose each user transmits continuously at 1 Mbps when transmitting, but each user transmits only 20 percent of the time. When circuit switching is used, how many users can be supported \_\_\_\_\_.  
A. 1 B. 2 C. 3 D. 4
- Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates  $R_1 = 500$  kbps,  $R_2 = 2$  Mbps, and  $R_3 = 1$  Mbps. Suppose the file is 4 million bytes. Dividing the file size by the throughput, roughly how long will it take to transfer the file to Host B \_\_\_\_\_.  
A. 64s B. 32s C. 16s D. 8s
- Which is an application layer protocol? \_\_\_\_\_.  
A. IP B. TCP C. DNS D. ICMP
- Creating a UDP client by Python: `clientSocket = socket(socket.AF_INET, socket._____)`  
A. SOCK\_DGRAM B. SOCK\_RAW C. SOCK\_STREAM D. SOCK\_PACKET
- In RDT model  
A. `rdt_send()` B. `rdt_rev()` C. `udt_deliver()` D. `udt_rcv()`



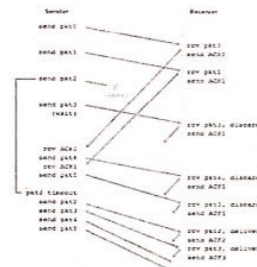
7. In RDT1.0 model



rdt1.0: sending side

- A. `rdt_send(data)` B. `udt_send(packet)` C. `rdt_rcv(packet)` D. `deliver_data(data)`

8. The following figure describes which protocol runs instance ( )?



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

9. If the link bandwidth is R, the maximum length of the datagram is L, the working window is a maximum of N datagrams, and the round-trip delay is RTT, then the best efficiency of the GBN protocol is ( )?
- A.  $N(L/R)/RTT$  B.  $N(L/R)/(RTT+L/R)$   
 C.  $(L/R)/(RTT+L/R)$  D.  $N(L/R)/(RTT+N(L/R))$
10. Suppose Host A sends two TCP segments back to Host B over a TCP connection. The first segment has sequence number 90; the second has sequence number 110. How much data is in the first segment ( )?
- A. 90 B. 110 C. 20 D. 21
11. Which of the following is false with respect to UDP
- A. Connection-oriented B. Unreliable  
 C. Transport layer protocol D. All of the mentioned
12. 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. 172.25.15.200 B. 172.25.25.15 C. 172.25.5.200 D. 172.25.35.15
13. 255.255.255.224 may represent ( )
- A. A Class C network address B. A broadcast address in a Class C network  
 C. A standard network mask for a Class C network  
 D. There are 30 IP addresses that can be assigned to the host in this subnet
14. 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
15. Which of the following is not a characteristic of Virtual Circuit Network ( )?
- A. There are setup and teardown phases in addition to the data transfer phase  
 B. Resources can be allocated during setup phase or on demand  
 C. All packets follow the same path established during the connection  
 D. Virtual circuit network is implemented in application layer
16. Which is not one of the routing protocol ( )
- A. OSPF B. RIP C. BGP D. ICMP
17. Which protocol is no collision ( )
- A. Pure ALOHA B. ALOHA C. CSMA/CD D. TOKEN TURNS

18. Ethernet frame consists of
- A. MAC address B. IP address C. both (a) and (b) D. none of the mentioned
19. Which of the following field in IPv4 datagram is not related to fragmentation?
- A. Flags B. Offset C. TOS D. Identifier
20. which is not the basic elements of a LAN? ( )
- A. the LAN topology B. the transmission media  
 C. Media access control method D. Network operating system

**Part Two. Fill-in-the-blank (填空题), each point per blank, total of 15 points.**

- the most commonly used Email protocols on the internet - POP3, IMAP and \_\_\_\_\_.
- \_\_\_\_\_ 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.
- \_\_\_\_\_ is a directory service that translates hostnames to IP addresses.
- \_\_\_\_\_ computing or networking is a distributed application architecture that partitions tasks or workloads between peers. Peers are equally privileged, equipotent participants in the application.
- \_\_\_\_\_ and "Selective Repeat Protocol" are the sliding window protocols.
- Historically, two routing protocols have been used extensively for routing within an autonomous system in the Internet: the \_\_\_\_\_ and \_\_\_\_\_.
- \_\_\_\_\_ is used by hosts and routers to communicate network layer information to each other. The most typical use of it is for error reporting.
- \_\_\_\_\_ is a networking device that forwards data packets between computer networks.
- \_\_\_\_\_ is a multi port bridge with a buffer and a design that can boost its efficiency, a data link layer device that perform error checking and forwarding data.
- \_\_\_\_\_ is a network protocol that listens to or senses network signals on the carrier/medium before transmitting any data.

11. There are two fundamental approaches to moving data through a network of links and switches: circuit switching and \_\_\_\_\_.
12. \_\_\_\_\_ is a transport-layer protocols which provides an unreliable, connectionless service to the invoking application.
13. The most important of delays in network are the nodal processing delay, queuing delay, \_\_\_\_\_, and \_\_\_\_\_.

**Part Three. Answer the following questions briefly(简答题), 7 points per question, total of 35 points**

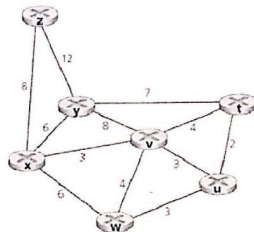
1. What are the five layers in the Internet protocol stack? What are the principal responsibilities of each of these layers?
2. List five nonproprietary application-layer protocols, the underlying transport-layer protocols and ports.

Application-layer Protocol	Transport-layer Protocol	Transport-layer Port

3. Describe how ARP protocol works to help a host *A* to successfully send a datagram to its destination *B* once *A* has no idea about *B*'s MAC address.
4. List the three categories of multiple access protocols, and describe at least two typical techniques introduced in each type.
5. Describe the four-step process about how DHCP protocol works.

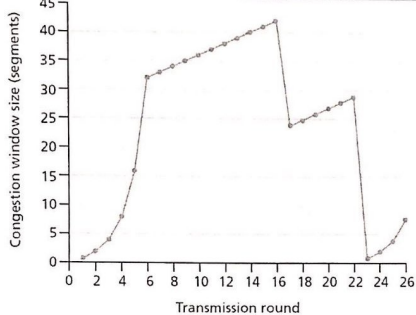
**Part Four. Analysis and computing (分析计算题), total of 30 points**

1. Consider the following network. 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 filling the following table. (total of 10 points, 0.5 points per cell)



Step	N'	D(t), p(t)	D(u), p(u)	D(v), p(v)	D(w), p(w)	D(y), p(y)	D(z), p(z)
0	x	$\infty$	$\infty$	3,x	6,x	6,x	8,x
1							
2							
3							
4							
5							
6							

2. Assuming TCP Reno is the protocol experiencing the behavior shown in the Figure below, answer the following questions. In all cases, you should provide a short discussion justifying your answer.
  - a. Identify the intervals of time when TCP slow start is operating. (1 point)
  - b. Identify the intervals of time when TCP congestion avoidance is operating. (1 point)
  - c. After the 16th transmission round, is segment loss detected by a triple duplicate ACK or by a timeout? (1 point)
  - d. After the 22nd transmission round, is segment loss detected by a triple duplicate ACK or by a timeout? (1 point)
  - e. What is the initial value of ssthresh at the first transmission round? (1 point)
  - f. What is the value of ssthresh at the 18th transmission round? (1 point)
  - g. What is the value of ssthresh at the 24th transmission round? (1 point)
  - h. During what transmission round is the 70th segment sent? (3 points)



3. Consider a datagram network using 32-bit host addresses. Suppose a router has four links, numbered 0 through 3, and packets are to be forwarded to the link interfaces as follows:

Destination Address Range	Link Interface
11100000 00000000 00000000 00000000 through 11100000 00111111 11111111 11111111	0
11100000 01000000 00000000 00000000 through 11100000 01000000 11111111 11111111	1
11100000 01000001 00000000 00000000 through 11100001 01111111 11111111 11111111	2
Otherwise	3

- Provide a forwarding table that has five entries, uses longest prefix matching, and forwards packets to the correct link interfaces. (4 points)
- Describe how your forwarding table determines the appropriate link interface for datagrams with destination addresses: (6 points)

11001000 10010001 01010001 01010101  
 11100001 01000000 11000011 00111100  
 11100001 10000000 00010001 01110111