四川大学期末考试试题（闭卷）

（2018~2019 学年第 1 学期）

B 卷

课程号： __311105040__ 课程名称： __计算机网络__ 任课教师：_____

适用专业年级： __软件工程 2016 级__ 学号：_____ 姓名：_____

题　　号	一(30%)	二(20%)	三(30%)	四(20%)
得　　分				
卷面总分		阅卷时间		

注意事项：1. 请务必将本人所在学院、姓名、学号、任课教师姓名等信息准确填写在试题纸和添卷纸上；

　　　　　　2. **请将答案全部填写在本试题纸上**；

　　　　　　3. 考试结束，请将试题纸、添卷纸和草稿纸一并交给监考老师。

评阅教师	得分

一、单项选择题（本大题共 20 小题，每小题 1.5 分，共 30 分）

提示：在每小题列出的四个备选项中只有一个是符合题目要求的，请将其代码填写在下表中。错选、多选或未选均无分。

1	2	3	4	5	6	7	8	9	10

11	12	13	14	15	16	17	18	19	20

1. The performance of a network can NOT be measured in terms of _____.

    (A) delay

    (B) congestion

    (C) throughput

    (D) packet loss

2. Which of the following packet delay is the time waiting for transmission onto the link and depends on the congestion level of router? _____

    (A) transmission delay

    (B) queuing delay

(C) propagation delay

(D) processing delay

3. In the following options, which service does NOT be provided to an application by TCP? _

   (A) reliable transport

   (B) flow control

   (C) video conferencing

   (D) congestion control

4. In the following options, which does NOT define in protocol? _____

   (A) the format of messages exchanged between two or more communicating entities

   (B) the order of messages exchanged between two or more communicating entities

   (C) the actions taken on the transmission of a message or other event

   (D) the transmission signals are digital signals or analog signals

5. When a user retrieve his email from mail server, which of following protocols can NOT be used? _____

   (A) POP3

   (B) HTTP

   (C) IMAP

   (D) SMTP

6. The transfer of a Web document from one host to another is: _____

   (A) loss-intolerant and time insensitive

   (B) loss-tolerant and time sensitive

   (C) loss-intolerant and time sensitive

   (D) none of the above

7. The conditional GET mechanism: _____.

   (A) imposes conditions on the objects to be requested

   (B) limits the number of response from a server

   (C) helps to keep a cache up-to-date

   (D) none of the mentioned

8. Which of the following protocols is an application protocol? _____

   (A) CSMA/CD

   (B) ICMP

   (C) OSPF

   (D) IMAP

9. Suppose a DNS resource record has Type=MX. Then _____

   (A) Value is the canonical hostname of the mail server that has the alias hostname Name.

   (B) Value is the IP address of the mail server that has the alias hostname Name.

   (C) Value is the canonical hostname of the DNS server that is authoritative for Name.

   (D) none of the above

10. In the following four options about web cache, which one is NOT correct? _____

    (A) A web cache is both a server and a client at the same time.

    (B) A web cache is purchased and installed by an ISP.

    (C) A web cache can raise the response time for a client request.

    (D) A web cache can reduce traffic on an institution's access link to the Internet.

11. There are two 16-bit integers: 1110 0110 0110 0110, 1101 0101 0101 0101. Their checksum is _____.

    (A) 0100010001000011

    (B) 1011101110111100

    (C) 111111111111111

    (D) 1000000000000000

12. The maximum amount of data that can be grabbed and placed in a segment is limited by the __.

    (A) MSS

    (B) MTU

    (C) checksum

    (D) sequence number

13. Pipelining requires which of the following _____.

    (A) Transmitting many packets before receiving acknowledgements

    (B) Sender-side buffering of unacknowledged packets

    (C) Unique sequence numbers for each in-transit packet

    (D) All of the above

14. The stop-and-wait protocol is highly inefficient when: _____.

    (A) There is a short distance between source and destination and the transmission rate is high.

    (B) There is a large distance between source and destination and the transmission rate is low.

    (C) There is a large distance between source and destination and the transmission rate

is high.

(D) There is a short distance between source and destination and the transmission rate is low.

15. Which ICMP message type is the basis for the Traceroute utility? _____

    (A) echo request

    (B) TTL

    (C) host unreachable

    (D) fragment reassembly time exceed

16. The following networks all are instances of virtual-circuit network EXCEPT _____

    (A) ATM

    (B) X.25

    (C) frame relay

    (D) Internet

17. The broadcast address of network 202.115.32.0/23 is _____

    (A) 202.115.32.255

    (B) 202.115.33.255

    (C) 202.115.255.255

    (D) 202.115.32.0

18. The source IP address in a DHCP discover message is _____.

    (A) the IP address of DHCP client

    (B) the IP address of DHCP server

    (C) 255.255.255.255

    (D) 0.0.0.0

19. The RIP protocol is an intra-AS routing based on _____ routing.

    (A) distance vector

    (B) link state

    (C) path vector

    (D) None of the choices are correct

20. If you are building a network in which only one host will be sending traffic, which of the following link protocols would give the best throughput? _____

    (A) frequency-division multiple access (FDMA)

    (B) time-division multiple access (TDMA)

    (C) token-passing

    (D) carrier sense multiple access (CSMA)

评阅教师	得分

二、判断改错题（本大题共 10 小题，每小题 2 分，共 20 分）

提示： 正确打✓，错误打✗，将其结果填写在下表中。

1	2	3	4	5
6	**7**	**8**	**9**	**10**

1. Traceroute program is a tool that can be used to determine the number of hops to a destination and the round trip time (RTT) for each hop.

2. DNS lookups often involve a combination of recursive and iterative queries.

3. Suppose that host A wants to send data over TCP to host B, and host B wants to send data to host A over TCP. Two separate TCP connections – one for each direction – are needed.

4. The Date: header in the HTTP response message indicates when the object in the response was last modified.

5. A transport-layer protocol provides for logical communication between hosts while IP provides logical communication between application process running on different hosts.

6. In the Go-Back-N sliding window protocol, the receiver needs to buffer any packet that is received out of order.

7. Switches will decrease the TTL field in the IP header.

8. In IP datagram, a checksum field in IP header is used to perform error detection for the whole datagram.

9. There is no network congestion in ATM CBR.

10. When an Ethernet sender detects that the media is idle, it sends a jam signal onto the media to tell other devices not to transmit, and then it sends its packet.

评阅教师	得分

三、简答题（本大题共 5 小题，每小题 6 分，共 30 分）。

1) Peer-to-peer (P2P) networking is a distributed application architecture that partitions tasks or workloads between peers. Peers are equally privileged, equipotent participants in the application. Peers are both suppliers and consumers of resources, in contrast to the traditional client-server model in which the consumption and supply of resources is

divided.

In P2P systems, the most significant threat it faces is something known as the free-rider problem. A free-rider is a user who obtains the file from the network without contributing any of it back. This prompts questions of unfairness to the remaining participants who actually contribute. Now, you are asked to design several strategies for a P2P file sharing system to solve the free-rider problem, so as to inspire users to share file resources. (4 points) (Note that, there is no standard answer to this question.)

2) Fill in the value of the congestion window size (number of segments) for each transmission round. Assume the threshold starts at 30 segments and the following events occur: (10 points)

- triple duplicate ACK during round 5
- timeout during round 10
- triple duplicate ACK during round 13
- timeout during round 16
- timeout during round 19

Round	Congestion Window Size	Round	Congestion Window Size
1		11	
2		12	
3		13	
4		14	
5		15	
6		16	
7		17	
8		18	
9		19	
10		20	

3) UDP and TCP use 1s complement for their checksums. Suppose you have the following three 8-bit bytes: 01011011, 01100110, 01110101. (Note that although UDP and TCP use 16-bit words in computing the checksum, for this problem you are being asked to consider 8-bit sums.) (6 points)

a) What is the 1s complement of the sum of these 8-bit bytes? Show all work. (2 points)

b) Why is it that UDP takes the 1s complement of the sum as the checksum; that is, why not just use the sum? (1 points)

c) With the 1s complement scheme, how does the receiver detect errors? (1 points)

d) Can the receiver be absolutely certain that no bit errors have occurred if it computes the Internet checksum for the received UDP segment and finds that it matches the value carried in the checksum field? Explain. (2 points)

4) Consider the following network in the below figure. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from E to all network nodes. (10 points)
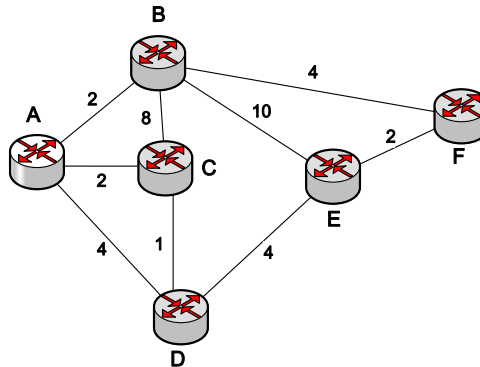
a) Show how the Dijkstra algorithm works by filling in the follow table for computing the least cost path from E to all destinations. (3 points)

Step	N'	D(A), p(A)	D(B),p(B)	D(C),p(C)	D(D),p(D)	D(F),p(F)
1	E					

b) From these results, show the least cost path from E to A, and briefly describe how you got that answer from your work in part a). (2 points)

c) What are distance vectors in nodes E, D, and C? In one or two sentences, explain how the least cost path from E to A was determined by E based on these three distance vectors. Note: you do not have to run the distance vector algorithm; you should be able to compute distance vectors by inspection. Answer For nodes E, D. and C respectively: (3 points)

d) Let us focus again on node E and distance vector routing. Suppose all distance vectors have been computed in all nodes and now suppose that the link from E to B goes down. Approximately how many distance vector messages will be sent by node E as a result of this link going down? Explain your answer. (2 points)

评阅教师	得分

四、分析题（本大题共 **1** 小题，共 **20** 分）。

Consider a company network as shown in below, where there are two routers R1 and R2, four switches S1, S2, S3, and S4, two servers DS1 and DS2, and seven hosts from node A to node G. All the interfaces of routers, hosts, and servers have been assigned IP address and MAC address (e.g. IP address is 121.48.192.1 and MAC address is1B-1B-1B-1B-1B-1B). **(20 points)**
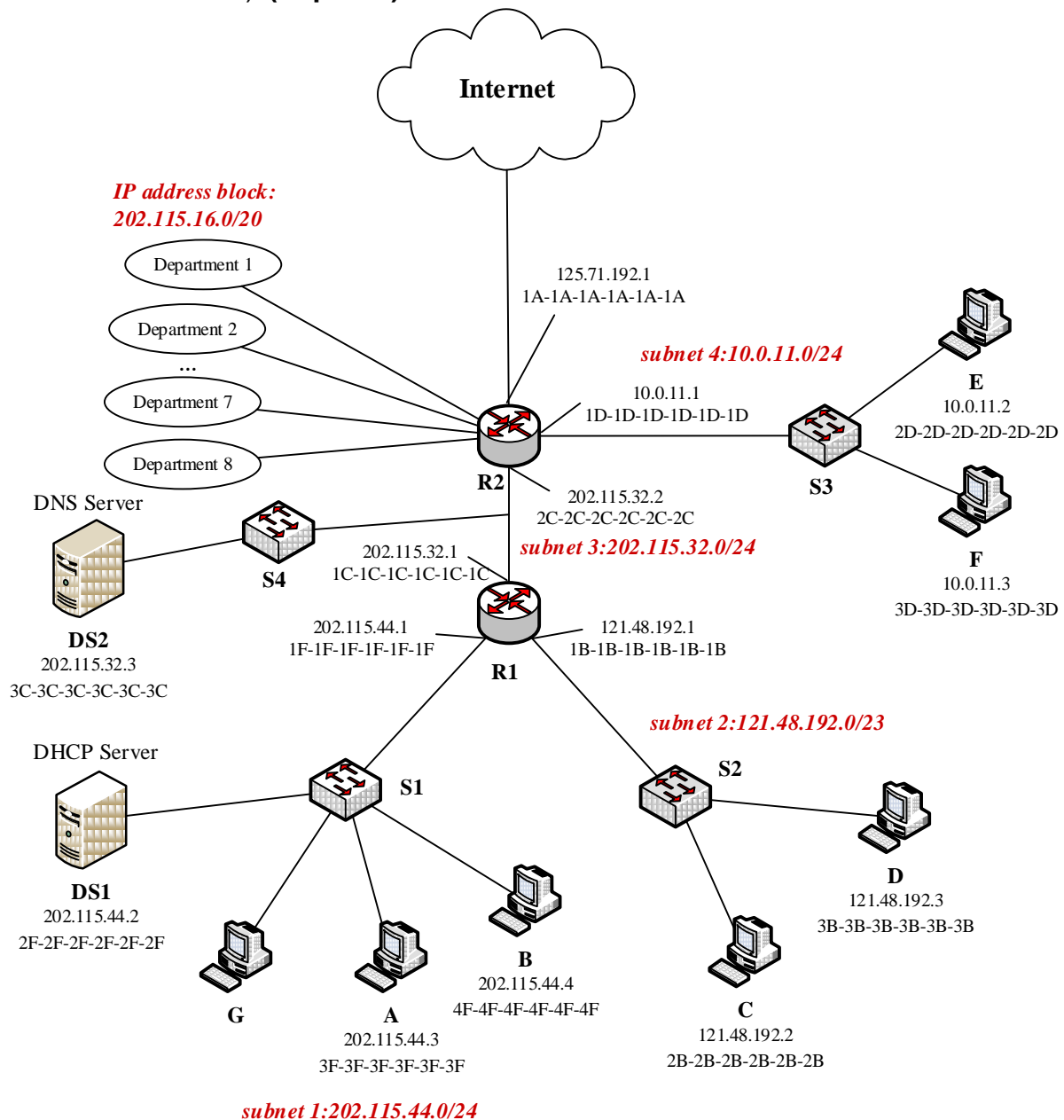
1) Assume node G is a new arriving host that does not have IP address. In order to obtain an IP address, node G must use DHCP protocol. Assume the IP address 202.115.44.5 is

free right now, which can be allocated to node G. Please fill in the below table to describe this process. **(4 points)**

Step	Source IP	Destination IP	yiaddrr
DHCP discover			
DHCP offer			
DHCP request			
DHCP ok			

2) DHCP can return more than just allocated IP address on subnet. What are the other information that node G can obtain from DHCP server DS1? **(3 points)**

3) Now suppose host C want to send an IP datagram to A. Let's assume the ARP caches of all the hosts in this network is empty while the routers (R1 and R2) has cached all the ARP records needed. Please fill in the below table to describe this process. **(4 points)**

Step	Source IP	Destination IP	Source MAC	Destination MAC
1				
2				
3				
4				

4) All datagrams leaving from subnet 4 to Internet have same single source IP address and different source port numbers. What is the same source IP address? **(2 point)** For each datagram of IPv4, which header fields will be modified at router R2? (Suppose the length of each datagram is less than the MTU.) **(3 points)**

5) Let's assume the company has obtained a block of addresses (202.115.16.0/20) from local ISP. We want to divide its address block into eight equal-sized contiguous address blocks to eight departments, respectively. What are the allocated address blocks for each department? **(4 points)**