Name:_____ ID:_____

CSE 474 Computer Networks

Fall 2012 Midterm Exam

13.11.2012 Tuesday, Duration: 100 minutes

Q1	Q2	Q3	Q4	B	SUM
/60	/15	/7	/18	/12	/100

Q1: Short Questions (3 x 20 = 60pts): Answers should be as brief as possible.

1.1. Give two examples for wireless access network protocols.

1.2. Give two differences between Cable and DSL.

1.3. Give an advantage of packet-switched network over circuit-switched network.

1.4. What happens if traffic intensity is closed to 1?

1.5. What is the meaning of "throughput"?

1.6. Does a TCP segment of a message greater than its corresponding IP packet? Why?

1.7. What is the difference between virus and worm?

1.8. Which transport protocols do DNS, FTP and SMTP use?

1.9. Give two examples for the stateless application layer protocols.

1.10. Can mail servers exchange e-mails using POP3 protocol? Why?

Name:_____ ID:_____

1.11. Give two advantages of using Web cache.

1.12. Which utility (program) would you use to find the host name for a specified IP address?

1.13. Consider that you join BitTorrent without possessing any chunks. Without any chunks, you cannot become a top-four uploader for any of the other peers, since you have nothing to upload. Which mechanism in BitTorent allows you to get your first chunk?

1.14. Is there an RFC for Skype protocol? Why?

1.15. How does Go-Back-N protocol overcome "lost-ACK" scenario?

1.16. Give three common fields of UDP header and TCP header.

1.17. Does TCP provide delay guarantee? Bandwidth guarantee? Congestion control?

1.18. In TCP, the sender does not overflow the receiver's buffer by transmitting too many segments. What is the name of this mechanism?

1.19. What happens when timeout is set to average Round Trip Time (RTT) in TCP?

1.20. What is the UDP checksum of the following three 16-bit words?: w_1= 1011011011011010, w2 = 0101010101010101, w3 = 1000100010001000

Name:_____ ID:_____

Q-2. (5 x 3 = 15 pts) Calculate the total time required to transfer a 2 MB file in the following cases, assuming a RTT of 100 ms, a packet size of 1 KB data, and an initial 2 RTT of "handshaking" before data is sent. Neglect the overhead due to headers.
(Note: You may assume that 1 MB = 1000 KB, 1 KB = 1000 B, 1 B = 8 bits, 1 Mbps=10^6 bps)

a. The transmission rate is 10 Mbps, and data packets can be sent continuously.

b. The transmission rate is 10 Mbps, but after the source finishes sending each data packet it must wait one RTT before sending the next.

c. The link allows infinitely fast transmit, but limits bandwidth such that only 20 packets can be sent per RTT.

Q-3. (7 pts) Suppose that you register the domain name mycompany.com with some registrar. First, you need to provide the registrar with the name and IP address of your primary authoritative DNS server. Suppose that name and IP address is dns1.mycompany.com and 196.196.196.1. For this authoritative DNS server, registrar would then make sure that the following Type NS and a Type A record are entered into the TLD com servers:

(_____, _____, NS)
(_____, _____, A)

You should also have to make sure that the following resource record should be entered into your authoritative DNS servers, for your Web server (www.mycompany.com, with IP address 196.196.71.5):

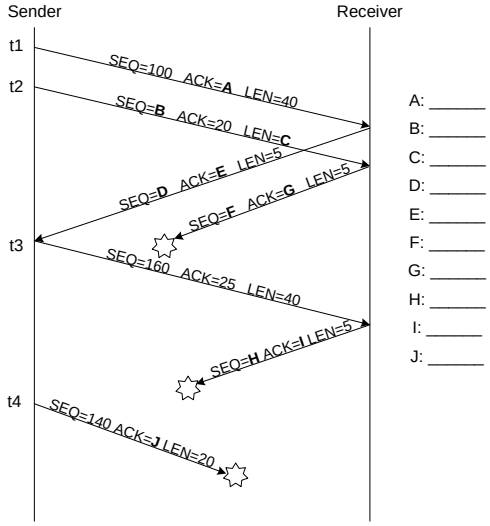
(_____, _____, _____)

Fill in the above blanks.

Name:_____ ID:_____

Q-4 (15 + 3 = 18 pts) a) Complete the missing sequence numbers (SEQ), acknowledgment numbers (ACK), and segment length (LEN) in the following TCP connection. We assume:

- **No timeouts occur at the receiver.**
- **The sender starts the timer at t1.**
- **The connection is full duplex (bi-directional data flow in same connection).**
- **The sender and the receiver have always data to transmit.**
- **There are no delayed acknowledgements at the sender or the receiver.**



b) Calculate the value of timeout for the segment with sequence number 140.

Bonus Questions (12 pts) (for whom read the book carefully):

B-1 (3 pts): Who published the first work on packet-switching technique?

B-2 (4 pts): Give an example of widespread use of Distributed Hash Tables in practice.

B-3 (5 pts): A large-scale DDoS attack against DNS root servers took place on October 21, 2002. Fortunately, this large-scale attack caused minimal damage, having little or no impact on users' Internet experience. What were the two reasons for this fortune?