# CSE204 Computer Networks
## 2018/2019 Spring – Final Exam

Name and Surname: Student Number:

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**Multiple Choice (Single Answer) Questions (50 pts, 5 points each)**

**Q1:** Link layer packet is called _____.

a. segment b. data c. frame d. datagram e. none of above

**Q2:** Which one is **not** true?

a. TCP provides a reliable byte-stream between client and server but UDP does not.

b. Nether TCP nor UDP guarantee that a certain value for throughput will be maintained.

c. Nether TCP nor UDP guarantee that data will be delivered within a specified amount of time.

d. Nether TCP nor UDP provide confidentiality (via encryption).

e. You would use TCP if you wanted to do a transaction as fast as possible.

**Q3:** Directory service that translates hostnames to IP addresses called _____.

a. HTTP b. SMTP c. Web service d. DNS

**Q4:** Assume that we have a trace route output as shown below.

```
 1    <1 ms    <1 ms    <1 ms  server88-208-200-1.live-servers.net [88.208.200.1]
 2    <1 ms    <1 ms    <1 ms  88.208.255.101
 3     5 ms     5 ms     5 ms  88.208.255.62
 4     *        *        *     Request timed out.
 5     5 ms     5 ms     5 ms  209.85.252.76
 6    16 ms    25 ms    16 ms  209.85.251.190
 7    22 ms    16 ms    16 ms  209.85.253.125
 8    17 ms    17 ms    16 ms  dy-in-f99.1e100.net [209.85.143.99]
```

Which node's IP address can be considered as an ocean-transatlantic link?

a. `88.208.200.1` b. `216.239.47.26` c. `209.85.251.190` d. `209.85.143.99`

**Q5:** The purpose of the _____ mechanism is to gradually expand the window until acknowledgments are received.

a. slow start b. window management c. backpressure

d. fast recovery e. none of above

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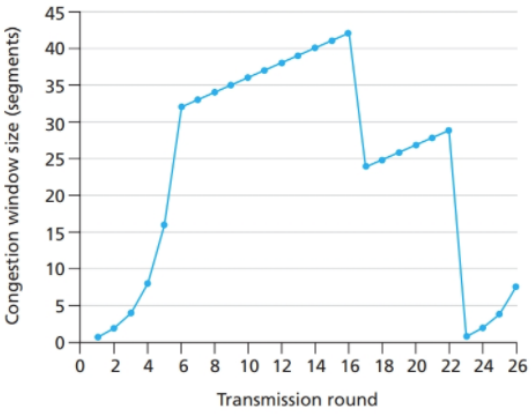
**Q6:** Please consider following figure (TCP Reno). Which segment triggers first loss event and what is the "ssthresh" after the loss event?




a. 39, 1 b. 32, 42

c. 42, 24 d. 1, 32

**Q7:** Assume that a NAT-enabled router (138.76.29.7) contains NAT translation table shown below and host (10.0.0.1) requests a web page from Google server. What destination address would appear on the datagram that NAT router received from Google server?

| NAT translation table | |
|---|---|
| WAN side addr | LAN side addr |
| 138.76.29.7, 3001 | 10.0.0.1, 4554 |

a. 138.76.29.7, 3001 b. 10.0.0.1, 4554

c. 10.0.0.1, 80 d. 138.76.29.7, 5001

**Q8:** Which one is **not** true?

a. Switches are link layer devices, routers are network layer devices.

b. Routers have different IP for its each interface.

c. Switch determines the good paths that packets take from senders to receivers.

d. Each router has a forwarding table that maps destination addresses to link interfaces.

**Q9:** Assume that sender has a message - 10101010 and receiver receives the message with **no** error, according to CRC generator size 4; which of the following could be the sender message and/receiver's remainder?

a. 101010100000/010 b. 101010100101/010

c. 101010100101/0000 d. 10101010010/0000

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**Q10:** Which of the following is **false** with respect to addressing scheme?

a. IP address is 32-bit, MAC address is 48-bit

b. IP address: like your student number, MAC address: like postal address

c. 1A-2F-BB-76-09-AD is an example of MAC, 192.168.1.1 is an example of IP address.

d. MAC is a flat address (portable), IP is a hierarchical address (not portable)

e. You can change IP addresses, but you cannot change MAC addresses

## General Format Questions

**Q11: (10 pts)** Please explain network utilization, goodput, packet drop, end-to-end delay.

**Q12: (10 pts)** Explain each delay that comprised by nodal delay as shown in formula below and indicate time scale (i.e. microseconds, milliseconds) of each with reasons.

$$d_{nodal} = d_{proc} + d_{queue} + d_{trans} + d_{prop}$$

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**Q13: (20 pts)** Assume that web cache is located at the institution LAN shown in the figure below and user within intuition LAN connecting to origin server to request HTTP contents. Users requests average object size is 1000 Kbps, average request rate from browsers to origin servers is 180/sec, RTT from institutional router to any origin server is 2 sec (uplink) and 50% requests satisfied at cache, 50% requests satisfied at origin. Please calculate the utilisation for LAN and access link and total delay that whether it requires administrator to increase the access link bandwidth or not.

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**Q14: (20 pts)** Ayşe attaches his laptop to campus network with wired connection, opens his browser and requests/receives a web page with using URL www.google.com. Please write/draw/explain all steps that Ayşe will go through to see google's web page in his browser (remember day in life scenario slides).