

RK

Written exam 25. 8. 2023

IME
PRIIMEK
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Pisni izpit traja 60 minut. Pišite kratko in jedrnato. Pripomočki niso dovoljeni, dovoljen je le preprost kalkulator.

1) (10) Draw a sketch of TCP/IP protocol stack and specify the tasks of the network layer

2) (20) NAT: in the private network, IP addresses from 10.5.5.0/24 are being used. The NAT router public interface's IP address is 193.5.5.7. NAT table is empty. Write down how the router reacts and what happens in the NAT table after the following events happen one after another:

- The router receives an IP datagram with the following header fields: source IP 10.5.5.3, source port izvora 3456, dest. IP 8.9.10.11, dest. port 7890.
- The router receives an IP datagram with the following header fields: source IP 8.9.10.11, source port 7890, dest. IP 10.5.5.3, dest. port 3456.
- The router receives an IP datagram with the following header fields: source IP 8.9.10.11, source port 7890, dest. IP 193.5.5.7, dest. port 3456.

	What happens in the NAT table?	How does the router react?
a.		
b.		
c.		

3) (20) Challenge- Response protocol

a. Explain the working of the basic challenge-response protocol and its vulnerabilities.

b. List two of the ways we can make it harder for an attacker to attack the basic challenge-response protocol.

4) (20) TDMA and FDMA – Answer the questions below with one sentence each.

a) What is a common strength of both protocols, TDMA and FDMA?

b) What is a common weakness of both protocols, TDMA and FDMA?

c) How are the two protocols different in their working?

d) What protocol layer do they belong to?

e) What is the main advantage of CSMA/CD over TDMA and FDMA?

5) (20) TCP

- a. The TCP transmitter's congestion window currently has the size of 32 MSS, with the MSS size of 2000 bytes. The last received ACK has the Receive Window parameter (RcvWin) in the header set to 32000 bytes. How many segments can the TCP transmitter send out based on this data?

- b. The TCP transmitter transmits the segments numbered 20000, 21000, 22000 and 23000. All of them are 1000 bytes long. The transmitter receives segments with ACK numbers 21000, 22000 and 23000. After that, the segments stop arriving. What will happen next?
 - i. After the timeout, the segment 23000 will be sent again.
 - ii. Nothing. All segments are acknowledged.
 - iii. Nothing. The receiver did not receive the last segment but does not have a mechanism to request it.

- c. Which is the phase of the congestion control where the congestion window is duplicated with every received ACK? What event causes this phase to end?

- d. The estimated RTT is 3 ms, the estimated offset from which RTT is 2 ms. What is the timeout interval? In the previous iteration, the estimated RTT was 4 ms, and the estimated offset was 2 ms.

6) (10) Calculate the values for IPv6 in IPv4 number.

	2001:1470:ffef:fe01:41a:18c8:8a90:51c3/56	88.200.37.209/27
Network address		
Min host address		
Max host address		
Broadcast address		
Number of hosts		