Internetworking (2G1305) Examination
Friday 26-August-05 9:00-13:00

Instructor: G. Q. Maguire Jr.

- ***No help material is allowed.***
- You may answer the questions in English or Swedish.
- The questions for ***section A*** should be answered ***on the exam itself***, for the other sections the questions should ***each*** be answered on a ***separate*** page.
- For multiple-choice questions, selecting a wrong alternative will reduce the number of points (with a lower limit of 0 points for the problem).
- The ***entire*** exam must be turned in along with your answers.

The exam is divided into three sections:

- ***Section A*** consists of multiple-choice questions. Each question is worth two points - if all correct alternatives (*regardless of how many there are*) are selected. Each missed correct alternative will reduce the score by one point. Each selected alternative that is wrong will also reduce the score by one point. The total score for each question will not be lower than zero.
- ***Section B*** consists of questions for which a short answer is sufficient. Each correctly answered questions is worth 2 points.
- ***Section C*** consists of questions where a longer answer (essay) is required. A correct answer is worth four points.

The exam grades will be:

- Grade 3: at least 26 points in section A alone.
- Grade 4:
  - at least 28 points in section A and
  - at least 4 points in section B and
  - at least 4 points in section C
- Grade 5:
  - at least 30 points in section A and
  - at least 6 points in section B and
  - at least 8 points in section C

Results will be announced on the institution's announcement board - before 2005-09-16.

Name/Your name: _____

Personnummer/student number: _____

Utbildningslinje/Your major _____

If you are a student from 2G1507 or another version of the course please indicate the course number: _____

Initials/Initials:	Section A:
Inlämnat/Handed in: :	Section B:
Antal sidor/Number of pages:	Section C:
	Betyg/Grade:

Please check off which questions you have answered:

Fråga/Questions	**Besvarad/**Answered	**Fråga är värd/** Question worth	**Rättning/** Grading	Subtotals
1	❑	2		
2	❑	2		
3	❑	2		
4	❑	2		
5	❑	2		
6	❑	2		
7	❑	2		
8	❑	2		
9	❑	2		
10	❑	2		
11	❑	2		
12	❑	2		
13	❑	2		
14	❑	2		
15	❑	2		
16	❑	2		
Total section A:				
17	❑	2		
18	❑	2		
19	❑	2		
20	❑	2		
Total section B:				
21	❑	4		
22	❑	4		
23	❑	4		
24	❑	4		
Total section C:				
			Total	

Section A: Multiple choice

1. The maximum *theoretical* UDP datagram size is:

   ❍ 576-28 = 548
   ❍ $(2^{16}-1) - 28 = 65,507$

2. Is the UDP checksum mandatory?

   ❍ Yes
   ❍ No

3. What does a router do when it receives a packet with the *destination* IP address 255.255.255.255?

   ❍ forward it
   ❍ drop it
   ❍ process the packet for itself
   ❍ encapsulate it and forward it
   ❍ encrypt it and forward it

4. The Domain Name Service has the following features:

   ❍ Each DNS sever locally stores all mappings
   ❍ It acts as a database
   ❍ It features caching
   ❍ It is centrally managed
   ❍ It is structured as a tree

5. TCP maintains a timer for:

   ❍ each byte in a stream
   ❍ each segment in a stream

6. In TCP's sliding window flow control who specifies the *offered* window?

   ❍ Sender
   ❍ Receiver

7. Modern TCP implementations support “Per-Route Metrics” - how many full windows need to have been exchanged before the per-route metrics will be updated?

   ❍ 1
   ❍ 2
   ❍ 4
   ❍ 8
   ❍ 16
   ❍ 32
   ❍ 64
   ❍ 128
   ❍ 256

8. SCTP provides which of the following features

   ❍ Reliable byte streams without record markers
   ❍ Multihoming
   ❍ Mobility
   ❍ Multiple streams
   ❍ A 3-way handshake to establish an association

9. The If-Modified-Since header in HTTP is used to avoid:

   ❍ Caching a page
   ❍ Use of a stale cached page
   ❍ Unnecessarily fetching a cached page
   ❍ An extra round trip time

10. IGRP Route Poisoning allows the use of a zero hold-down time?

    ❍ True
    ❍ False.

11. Which of the following that is ***not*** included in an IPv6 fragment, but is included in an IPv4 fragment:

    ❍ Fragment offset
    ❍ Do not fragment flag
    ❍ More fragments flag

12. Can user data be carried in the second segment of a ***TCP*** open?

    ❍ Yes
    ❍ No

13. Mobile IP ***must*** or ***may*** tunnels packets in which of the following situations:

Must	May	
❍	❍	From a corresponding node to the Home Agent
❍	❍	From the Home Agent to a Foreign Agent
❍	❍	From a Foreign Agent to the Home Agent
❍	❍	From the Home Agent to a corresponding node

14. A NAT may perform which of the following:

    ❍ Network address translation
    ❍ Port address translation
    ❍ Type of Service translation

15. DNS has which of the following features:

    ❍ caching
    ❍ flat name space
    ❍ hierarchical name space
    ❍ a single copy of any item of information

16. In link state routing protocols each node knows:

    ❍ the state of ***all*** links in the network
    ❍ ***only*** the state of links to its neighbours
    ❍ ***only*** the state of links on the shortest path tree

Section B: Short Answers

17. Describe the purpose of a AAAA Resource Record in DNS.

18. Describe the function of the SCTP cookie.

19. For an incoming IP packet - the Version, Protocol, and Source & Destination IP addresses fields are all used for what purpose?

20. Why are IPV4 options rarely used?

Section C: Essay Answers

21. Describe the problems for TCP in terms of the Bandwidth-Delay Product for a “long fat pipe”? What solution does TCP adopt?

22. Give an example of a stateless server and explain what advantages it derives from being stateless.

23. Contrast the transport and tunnel modes for Encrypted Security Payloads (ESP) as used in IPv6.

24. Contrast Protocol Independent Multicast in sparse mode vs. dense mode.