สถาบันเทคโนโลยีพระจอมเกล้าธนบุรี
มหาวิทยาลัยเทคโนโลยีพระจอมเกล้าธนบุรี

Seat Number

King Mongkut's University of Technology Thonburi
Final Examination
Semester 1 -- Academic Year 2011

Subject: ENE 422 Data Communications
For: Electrical Communication and Electronic Engineering, 4th Yr (Bilingual Program)
Exam Date: Monday Sept. 26, 2011 **Time:** 9.00-12.00 am.

Instructions:-

1. This exam consists of 31 problems with a total of 9 pages, including the cover.
2. This exam is closed books.
3. You are allowed to use 4 written A4 notes for this exam.
4. Answer each problem on the exam itself.
5. A calculator compiling with the university rule is allowed.
6. A dictionary is **not** allowed.
7. **Do not** bring any exam papers and answer sheets outside the exam room.
8. Open Minds … No Cheating! GOOD LUCK!!!

Remarks:-

- **Raise your hand when you finish the exam to ask for a permission to leave the exam room.**
- **Students who fail to follow the exam instruction might eventually result in a failure of the class or may receive the highest punishment with university rules.**
- **Carefully read the entire exam before you start to solve problems. Before jumping into the mathematics, think about what the question is asking. Investing a few minutes of thought may allow you to avoid twenty minutes of needless calculation!**

Page No.	2	3	4	5	6	7	8	9	Total
Full Score	30	44	38	25	28	25	30	30	250
Graded Score									

Name _____ **Student ID** _____

This examination is designed by
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This examination has been approved by the committees of the ENE department.

(Assoc. Prof. Wudhichai Assawinchaichote, Ph.D.)
Head of Electronic and Telecommunication Engineering Department

Name-surname _____ ID _____

1. In a block of addresses, we know the IP address of one host is 182.44.82.16/26.
   a. What is the first address?
   b. What is the network address?
   c. What is the last address?
   d. What is the number of address in this block?
   (15 points)

2. What does a mask number tell about? (5 points)

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3. An organization is granted a block of addresses starting with 182.44.82.0/26. It needs to distribute these into three subnets 32, 16, 16 addresses. Design the subnets and find out how many addresses are still available after these allocations. (10 points)

Name-surname _____ ID _____

4. What technique can reduce the address depletion problem? Describe how it handle outgoing and incoming packet. What is the condition of this technique? (10 points)

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5. Show the original (unabbreviated) form of the address 123::1:2 (5 points)

6. What kind of address is recommended to be used in the Node Identifier field of IPv6 address? (4 points)

7. Describe about connectionless services and unreliable protocol (10 points)

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8. Which field of the IPv4 header changes from router to router? (5 points)

9. Calculate the HLEN value in IPv4 if the total length is 2000 bytes, 1976 of which is data from upper layer. (5 points)

10. How does the receiving network layer know to which protocol the data belong? (5 points)

Name-surname _____

11. When does a datagram need to be fragmented? (10 points)

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12. What is the identification number in IPv4 header useful for? (5 points)

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13. Use 3 fragments to send data 5000 bytes. First fragment contains 2000 bytes. Second fragment contains 2000 bytes and the last one has 1000 bytes. Show the values of byte numbers, total length, more flag and offset of each fragment. (10 points)

Byte numbers	Total length	More flag	Offset

14. List how to reassemble the original datagram from the fragments in problem 13. (8 points)

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15. What field in IPv4 datagram is the same as next header field in IPv6? (5 points)

Name-surname _____ ID _____

16. Calculate the value of checksum (10 points)

4	5	224	29
45		1	170
32	6	checksum	
11.12.14.6			
100.6.7.9			

17. Is it possible IPv4 packet carries an IPv6 packet as data? If it is, when is it happened? (5 points)

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18. What is the target hardware address in the ARP request packet? (5 points)

19. What is the destination address in the encapsulated ARP request packet in a data link frame? (5 points)

20. What is DHCP devised for? (4 points)

21. What kind of error reporting does ICMP generate if a router or a host discards a datagram due to congestion? (5 points)

22. What is the purpose of including the IPv4 header and the first 8 bytes of datagram data in the error reporting ICMP message? (5 points)

23. What kind of query message is used by the *ping* program? (4 points)

24. If there is only one host interested in a group, but the host is shut down or removed from the system, how can the multicast router solve this problem? List the procedure. (10 points)

Name-surname _____ ID _____

25. What is the delayed response for? Describe the concept. (10 points)

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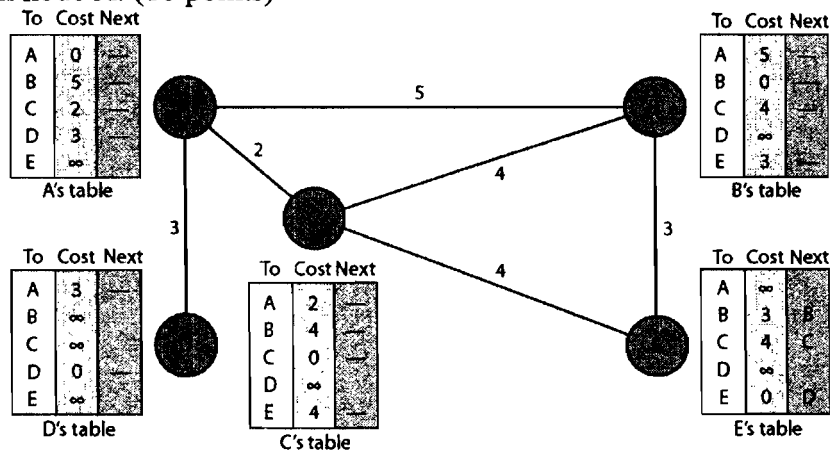
26. Routing table of router R1 is given below. (15 points)

Mask	Network address	Next hop	Interface	Flag
255.255.240.0	153.18.16.0	-	m0	U
255.255.0.0	169.254.0.0	-	m1	U
0.0.0.0	0.0.0.0	153.18.31.254	m1	UG

a. Draw the topology of the network.
b. Explain the forwarding process if a packet arrives at R1 with the destination address 180.70.65.140
c. What does the letter G mean?

Name-surname _____ ID _____

27. From Figure below, write D's modified table and D's new table after receiving the partial from node A. (10 points)



28. A UDP header in hexadecimal format is 0632000D001CE217 (20 points)

a. What is the source port number?

b. What is the destination port number?

c. What is the total length of the user datagram?

d. What is the length of data?

e. Is the packet directed from a client to a server or a server to a client? Give a reason.

f. What is the client process?

Name-surname _____ ID _____

29. How does TCP make data urgent? (10 points)

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30. TCP terminates a connection using a sequence number 14,534 and send data 1000 bytes in the same segment. The other party announces the closing of connection with a sequence number 21,732. Show the data flow. (15 points)

31. Tell the reason why it is called fast retransmission. (5 points)

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