King Mongkut's University of Technology Thonburi

Midterm Exam of First Semester, Academic Year 2011

ENE 422 Data Communications

Electronic and Telecommunication Engineering, 4th Yr. (Biligual Program)

Tuesday 19 July, 2011 **Time: 9.00-12.00**

Instruction

1. This exam paper contains 26 problems, 7 pages.

2. Write your answer in this exam paper.

3. Calculator is allowed.

4. Four written A4 can be taken into the exam room.

5. Do not take the exam paper out of the exam room.

Students must raise their hand to inform to the proctor upon their completion of the examination, to ask for permission to leave the examination room.

Students must not take the examination and the answers out of the examination room.

Students will be punished if they violate any examination rules. The highest punishment is dismissal.

Name-surname _____ ID _____ Seat Number _____

This examination is designed by

Assoc. Prof. Raungrong Suleesathira, Tel. 9060

This is to certify that the exam paper has already been approved by the academic committee of the department of Electronic and Telecommunication Engineering

Assoc. Prof. Wudhichai Assawinchaichote

Head of Department of Electronic and Telecommunication Engineering

1. Draw the waveform of the differential Manchester scheme using the data streams 0011010, assuming that the last signal level has been positive. (5 points)

2. What is the drawback of the Manchester scheme compared to NRZ? (5 points)

3. Explain how to alleviate the problem when there is a long sequence of 0s which can make the receiver clock lose synchronization. (5 points)

4. What is the average baud rate of 10B5Q in term of the bit rate N? (5 points)

5. Describe the meaning of 10B5Q. (5 points)

6. Do you think 8B4Q is the same as 4D-PAM5? Give a reason. (5 points)

7. What kind of encoder is used in LANs for error detection? How many bits are augmented in to a dataword? (5 points)

8. Two communicating devices are using a simple parity-check code for error correction. The transmitter sends 1010101 and because of channel noise, the receiver gets 1001101. Will the receiver detect the error? Why or why not? (5 points)

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9. If we use the Hamming code C(9,6) for the problem 8, will the receiver detect the error? Why or why not? (5 points)

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10. Two neighboring node (A and B) use Selective Repeat ARQ with a 3 bit sequence number. Assuming A is transmitting and B is receiving, show the window position and draw a flow diagram for the following events. (22 points)
    - Timer0 starts. Frame0 is sent.
    - Timer1 starts. Frame1 is sent at the same time that node B sends ACK frame. Frame1 is lost during the transmission.
    - ACK frame arrives to node A safely. Timer0 stops.
    - Timer2 starts. Frame2 is sent and go to node B safely.
    - Draw the frames that node B and node A have to do next to complete this transmission of Frame1.

11. Calculate the checksum for the text "89TEST". Use ASCII to change each byte to a 2-digit hexadecimal number as: 8 is represented by 0x08, 9 is represented by 0x09, T is represented by 0x54, E is represented by 0x45 and S is represented by 0x53. (6 points)

12. What field in the PPP frame makes the system know that the payload field is the encapsulated IP packet? (4 points)

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13. What is the advantage of CHAP? (4 points)

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14. Draw a flow diagram using HDLC. (20 points)
    - Node A sends data frame0 to node B. The frame arrives safely.
    - Node A sends data frame1 to node B but the frame is lost.
    - Node A sends data frame2 to node B. The frame arrives safely. Node B keeps the frame.
    - Draw the next frame that node B should send to node A.

15. What is the disadvantage of CSMA/CD even though it senses the channel before transmitting? (5 points)

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16. In CDMA/CD, should the propagation time be less than or more than the transmission time? Give a reason. (5 points)

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17. List the differences between CSMA/CD and CSMA/CA. (8 points)

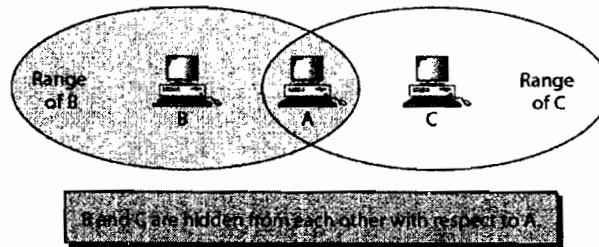|	CSMA/CD	CSMA/CA
1.		
2.		
3.		
4.		

18. What is the last 2 bits of the SFD field in MAC frame for? (5 points)

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19. Fill the table. (10 points)

Characteristics	10Base5	10Base2	10Base-T	10Base-F
Media				
Maximum length				
Line coding				
Topology				
Collision at				
Access method				

5

20. How can the hidden station problem be solved? (10 points)

Range of B

Range of C

B   A   C

B and C are hidden from each other with respect to A

   a. If station B is sending data to station A first. Explain.
   b. If station A is sending data to station B first. Explain.

a)   b)

21. Why does IEEE 802.11 define two MAC sublayers: the distributed coordination function (DCF) and point coordination function (PCF)? (5 points)

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22. What is the advantage of dividing an Ethernet LAN with a bridge? (5 points)

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23. Explain how a bridge makes a table? (5 points)

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24. Explain how a bridge blocks or forwards a frame? (5 points)

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25. Find the network address, netid and the hostid of the address 132.56.8.6. (6 points)

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26. Show the calculation why the number of block of class B equal to 16,384. (5 points)

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