Name...Student ID........................

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination Semester I: Academic Year: 2005

Date : 3 October 2005   Time : 9.00 – 11.00   Room : A401

Subject : 240-461 Telecommunication, Wireless and Mobile Networking

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Instruction:

- Make sure that there are 5 problems (40 points) in your exam paper.
- This exam is **closed book** and you have 2 hours to complete your exam.
- All of your answers can be written in Thai or English.
- Dictionary is allowed.
- No palm pilots or other hand held computers are allowed.

Problem 1 (4 points):

Put a tick under T (True) or F (False) for each of the statements below.

	Statement	T	F
1	In wireless, sensing carrier does not always reveal the right information about the status of the wireless channel.		
2	Hidden and exposed terminal problems can be eliminated or reduced by use of RTS/CTS messages.		
3	In IEEE 802.11b MAC protocol, sender waits for an ACK after sending a data-frame to a receiver, since it is not possible to detect if the data frame has collided with some other transmission.		
4	Random access MAC schemes may be more suited for data traffic than coordinated MAC schemes.		
5	IEEE 802.11b systems that employ FHSS technique can support higher data-rates than systems that employ DSSS technique.		
6	Both Ethernet (IEEE 802.3) and Wireless LAN (IEEE 802.11b) MAC layers do not support *segmentation and reassembly* (SAR) (in other words *fragmentation*).		
7	Bluetooth uses GFSK modulation with frequency hopping		
8	Although both 802.11 and Bluetooth networks operate in the ISM band, they do not interfere each other due to the strength of MAC protocols		

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Problem 2: IEEE 802.11 Wireless LAN Standard

a) Describe why the approach that collisions are detected at the sender does not work
   well in wireless networks. (Give scenarios to support your explanation) (6 points)

b) Provide a detailed description of how IEEE 802.11 MAC works. *(6 points)*

c) How does the PCF (Point Coordination Function) and DCF (Distributed Coordination Function) modes coexist? *(3 points)*

Problem 3: QoS Enhancement Standard in Wireless LANs

a) In the IEEE 802.11 network, explain why the time-bounded services using PCF (Point Coordination Function) mode is considered having QoS limitations. (3 points)

b) In the IEEE 802.11e, describe how Enhanced Distributed Coordination Function (EDCF) for the contention period can provide service differentiation (or relative priority classes). Also, use brief diagrams to support your explanation (6 points)

Problem 4: Bluetooth

a) Bluetooth networks organize themselves into small cells called piconets. How does Bluetooth deal with interference between several different piconets that are within range of each other? (3 points)

b) Suggest the type of link that can be well supported for voice communication between a master and a slave in a piconet **and** also give the reasons to support your idea.
(3 points)

Problem 5: Wireless Application Protocol

a) Is it possible to use WAP phone to directly connect to a HTML homepage? Why? And how can we overcome this problem? (3 points)

b) Can we build a webpage, which can support both of WAP and WWW? And why this technique makes our webpage possible on supporting both of WAP and WWW? (3 points)