PRINCE OF SONGKLA UNIVERSITY

FACULTY OF ENGINEERING

Final Examination Semester II : Academic Year : 2005

Date : 26 February 2006 Time : 9.00 – 12.00 Room : R201

Subject : 240-544 Telecommunication, Wireless and Mobile Networking

---

Instruction:

- Make sure that there are 5 questions (100 marks) in your exam paper.
- This exam is **closed book** and you have 3 hours to complete your exam.
- All of your answers can be written in Thai or English.
- Dictionary and Calculator are allowed.
- No palm pilots or other hand held computers are allowed.

1. IEEE 802.11 Wireless LAN Standard and QoS Enhancement

a) Provide a detailed description and diagram of how the IEEE 802.11 MAC protocol works. (10 points)

b) In the IEEE 802.11 network, explain why the time-bounded services using PCF (Point Coordination Function) mode is considered having QoS limitations. (5 points)

c) 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 (10 points)

2. 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? (10 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. (10 points)

3. TCP in wireless environments

Two big issues for TCP in a wireless environment are 1) fluctuations and shrinkage of the window size, and 2) coarse-grain timeouts.

a) What are the causes of each of these problems? (10 points)

b) Specifically, how does each problem affect the connection's performance? (10 points)

4. Mobile IP

a) It is possible for a mobile node to use its home address on a foreign network (i.e. to not have a valid local address). Explain how this is possible, how the mobile unit finds the Foreign Agent (FA) and how the home-address is treated on the visited network! (10 points)

b) Describe in detail what happens when another computer on the host's home network sends a network packet to the roaming client and when a reply is sent back! (10 points)

5. IP Micro-mobility

Explain why the Mobile IP protocol is not well suited when it is applied to wide area wireless networks with high-mobility users that may require QoS. And explain how the Mobile IP is extended in Micro-mobility protocols in order to handle these inefficiencies. (15 points)

Suntorn Witosurapot

February 2006