CSE 4215/5431 Midterm test
Winter 2011
March 1, 2011
Instructor: S. Datta

Name (LAST, FIRST): _____

Student number: _____

Instructions:

1. If you have not done so, put away all books, papers, cell phones and pagers.
2. Check that this examination has 8 pages. There should be 5 questions together worth 30 points.
3. You have 90 minutes to complete the exam. Use your time judiciously.
4. If you need to make an assumption to answer a question, please state the assumption clearly.
5. Points will be deducted for **vague and ambiguous** answers.
6. Your answers MUST be LEGIBLE.

Answer the questions in the spaces provided on the question sheets. If you run out of room for an answer, continue on the back of the page.

1. (a) (1 point) In frequency-hopping spread spectrum, what is the difference between fast hopping and slow hopping?

(b) (1 point) Why is the use of infra red transmission in wireless LAN's no longer common?

(c) (1 point) What is the difference between scattering and diffraction of radio waves?

(d) (1 point) What is the difference between binary phase shift keying (BPSK) and quadrature phase-shift keying (QPSK)?

2. This question concerns channel effects. Suppose that you are sending rectangular pulses as part of your communication system.

   (a) (2 points) Describe very briefly the distortions that channel limitations of a well-shielded wired medium causes to the signal.

   (b) (2 points) Describe the distortions that a wireless, noisy medium in an obstacle-free space would cause to the signal.

(c) (2 points) Describe the distortions that the presence of obstacles in the wireless transmission zone would cause to the signal.

(d) (2 points) Explain what *additional* distortions mobility would introduce.

3. (a) (2 points) Describe how IEEE 802.11 achieves polling-based contention-free access and RTS/CTS based contention resolution on the same medium. You do not have to describe DFWMAC-DCF or DFWMAC-PCF – describe how they are both possible on the same channel.

(b) (4 points) Describe the collision avoidance mechanisms adopted in IEEE 802.11 DFWMAC-DCF.

4. (a) (3 points) Both versions of spread spectrum (FHSS, DSSS) require the use of codes. What properties must FHSS codes satisfy? What properties must the codes used in DSSS satisfy?

   (b) (3 points) Describe briefly how direct sequence spread spectrum provides medium access control and robustness against some types of noise.

5. (6 points) In a centralized demand assignment protocol like RMAC, what problems are caused by mobility? List the major problems you foresee and propose possible solutions to these problems.

Use this page if you need extra space