Dept. Math. & Comp. Sc. **Midterm Computer Networks**
Vrije Universiteit **23.03.2004**

1a What is the difference between a *point-to-point* network and a *peer-to-peer* network? *5pt*

1b Explain the difference between a connection-oriented and connectionless service. *5pt*

2a What does Fourier analysis teach us about sending digital signals? *5pt*

2b Consider a network in which a switch can be set by sending it a message (through a separate network) telling it to route packets (from A) coming in on interface In_i to interface Out_j. In this way, it is possible to set up a *virtual circuit* from A to B by properly setting all switches between A and B. Would you call this scheme circuit switching or packet switching? Motivate your answer! *5pt*

3a Consider a 1-bit error correcting code that uses 3 redundant bits. If p is the probability that the transmission of a single bit fails, what is the probability of successfully transmitting a frame containing m data bits? Note that the total frame length is $m + 3$ bits. *5pt*

3b Now consider a 1-bit error-detecting code that uses 1 redundant bit. For which value of p is this code a better alternative if frames are sent only once? *5pt*

4a Explain the hidden and exposed station problem in wireless networks, and how these problems are solved. *5pt*

4b Consider a home network consisting partly of a 802.3 (10/100 Mbps Ethernet) network and partly of a 802.11b (11 Mbps wireless LAN) network. The two parts are connected by means of a bridge. What are the main problems to solve when a wireless station communicates with a host connected to the Ethernet segment. *5pt*

4c Consider two 10 Mbps Ethernet segments that need to be connected. What is the difference between the use of a repeater and a switch? *5pt*

Grading: *The final grade is calculated by accumulating the scores per question (maximum: 45 points), and adding 5 bonus points. The maximum total MT is therefore 50 points. The final exam consists of two parts. Part 1 covers the same material as the midterm. Let $P1$ be the number of points for part 1, and $P2$ the number of points for part 2 (each being at most 50 points). The final grade E is computed as $E = \max\{MT, P1\} + P2$. The midterm exam counts only for first full exam.*