Dept. Math. & Comp. Sc.	**Midterm Computer Networks**
Vrije Universiteit	**01.04.2005**

1a List the layers of the OSI reference model, and briefly describe each of them. *10pt*

1b Explain the role of a backbone in the Internet. *5pt*

2a What does Fourier analysis actually tell us about digital signals? *5pt*

2b There are three different modulation techniques. Describe each of them briefly. *5pt*

2c What is the role of a splitter in ADSL? *5pt*

3a Assume a frame is delimited by the flag byte 01011011. What would you do when this byte is to be sent as data in the payload of the frame? *5pt*

3b Explain, by means of an example, why the number of sequence numbers in a sliding window protocol needs to be at least twice as large as the window size. *5pt*

3c If the propagation time is high, and the transmission speed is high, we generally prefer a large window size. Why can we reduce the window size if the propagation time decreases? *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.*