March 12, 2003

Graduate Comprehensive Exam
Computer Networks
Spring 2003

Student Name: __________________________ Student ID: ______________________

Answer all questions on the exam. You may use the back of the page if necessary for additional space.
Total: 100 points. Good Luck.
March 12, 2003

[1] (30 pts):
   a) What is a network reference model and why it is necessary?
   b) Contrast the differences between TCP and OSI.
   c) If a printer can interpret physical addresses but cannot interpret an IP address, at what layer it is failing?
      Explain your answer
(30 pts) In routing:
a) Discuss fairness and optimality and describe the conflict that occurs between these two routing goals.
b) What is the difference between adaptive and non-adaptive routing algorithms?
c) Describe one adaptive and one non-adaptive routing algorithm.
[3] (20 pts) Given that
Latency = Propagation Delay + Transmit Time + Queue
Transmit Time = Size / Bandwidth
Calculate:
   a) the approximate total time (in seconds) required to transfer 1.5MB(Megabyte) file given that the RTT (Round-Trip Time) is 200ms, the bandwidth is 2Mbps(Megabit/sec), packet size is 1KB (Kilobyte) but all data packets can be sent continuously.
   b) the same as above but there is an initial handshaking before the data is sent which costs 2*RTT
(20 pts) UDP and TCP

a) Discuss the main difference between UDP and TCP.

b) Discuss two tradeoffs in choosing UDP or TCP.

c) Discuss and application protocol for which UDP is more appropriate. Explain.

d) Discuss and application protocol for which TCP is more appropriate. Explain.