

# Introduction to Computer Networks

Final Examination

June 13, 2003

**Important Note: Do not copy directly from the textbook. Use your own words in stating your answers.**

1. In wireless LAN, (a) show by example that exchanging RTS/CTS messages between communicating mobile stations can solve the hidden terminal problem. (10%) (b) Explain why the length of the SIFS period must be shorter than the DIFS period. (10%)
2. Figure 7.29 on page 655 of our textbook shows the operations that Alice must perform to provide confidentiality, authentication, and integrity. Diagram the corresponding operations that Bob must perform on the package received from Alice. (10%)
3. State two advantages of the public-key cryptography over symmetric-key cryptography and explain. (10%)
4. The Internet BGP routing protocol uses the MD5 message digest rather than public key encryption to sign messages. Why do you think MD5 was chosen over public key encryption? (10%)
5. Explain why a longest prefix matching is needed in a typical router. (10%)
6. The inter-AS routing protocol BGP uses a protocol similar to the distance vector protocol. Describe how loops in routing paths could be detected in BGP? (10%)
7. Sliding window protocols are used in both the transport layer and data link layer flow control. State at least two major differences in transport layer and data link layer sliding window protocol. (10%)
8. Refer to the IP datagram format on page 334 of our textbook. Explain why the unit of the Header length is 32-bit word, unit of the Datagram length is byte, and unit of the Fragmentation offset is 8 bytes. (15%)
9. For the LAN on the right, show a set of minimal number of unicast frames that are needed to send by the computers so that all the bridges can learn the locations of all computers? (10%) Show a frame with the notation (frame source-node name, destination-node name). For example, (A, C) indicates a frame sent from node A to node C.