

CLOSE BOOK，考試時數四小時

第一部分：

1. The following router forwarding table entry has the prefix / 12. (5%)
10101010 10100000 00000000 00000000 (170.160.0.0)
Does it match the following destination address in an arriving IP packet? Explain.
10101010 10101011 11111111 00000000 (170.171.255.0)
2. a) Describe the elements in a typical 802.11 LAN today. (2%)
b) Can you have a completely wireless LAN? Explain how this is possible, and explain its limitations. (3%)
3. List the reasons why Layer 3 switches are faster than routers. (5%)
4. a) List and briefly describe the major service quality parameters. (3%)
b) What is an SLA? (2%)
5. a) Distinguish between transport and tunnel modes in IPsec. (3%)
b) When is each used? (2%)
6. a) Does H.323 use servers? How? (3%)
b) If most P2P applications use facilitating servers, why do we still call them peer-to-peer? (2%)
7. a) Does public key encryption have a problem with secure key exchange for the public key? Explain. (3%)
b) How does public key encryption address symmetric key encryption's problem with secure key exchange? (2%)
8. a) Why are VPNs attractive? (3%)
b) How can latency be controlled for intranets? (2%)
9. a) Briefly describe the sizes of ATM headers, payloads, and cells. (3%)
b) In what two ways does ATM reduce switching cost? (2%)
10. How do you think TCP/IP standards will have to change in the future to continue to improve the Internet? (5%)

第二部分：

1. What is the difference between network management and service management? 5%
 2. Suppose N people want to communicate with each of $N-1$ other people using symmetric key encryption. All communication between any two people, i and j , is visible to all other people in this group of N , and no other person in this group should be able to decode their communication. How many keys are required in the system as a whole? Now suppose that public key encryption is used. How many keys are required in this case? 5%
 3. What is the difference between end-to-end delay and packet jitter? What are the causes of packet jitter? 5%
 4. Suppose two nodes, A and B , are attached to opposite ends of a 900 m cable, and that they each have one frame of 1,000 bits (including all headers and preambles) to send to each other. Both nodes attempt to transmit at time $t = 0$. Suppose there are four repeaters between A and B , each inserting a 20-bit delay. Assume the transmission rate is 10 Mbps, and CSMA/CD with backoff intervals of multiples of 512 bits is used. After the first collision, A draws $K = 0$ and B draws $K = 1$ in the exponential backoff protocol. Ignore the jam signal.
 - a. What is the one-way propagation delay (including repeater delays) between A and B in seconds? Assume that the signal propagation speed is $2 \cdot 10^8$ m/sec. 5%
 - b. At what time (in seconds) is A 's packet completely delivered at B ? 5%
- NOTE: YOU MUST SHOW ALL YOUR WORKS.**
5. Consider the topology and link costs shown in Figure Part2-1 and suppose that node E is the multicast source. Using arrows like those shown in Figure Part2-2, indicate links over which packets will be forwarded using RPF (reverse path forwarding), and links over which packets will not be forwarded, given that node E is the source. 10%

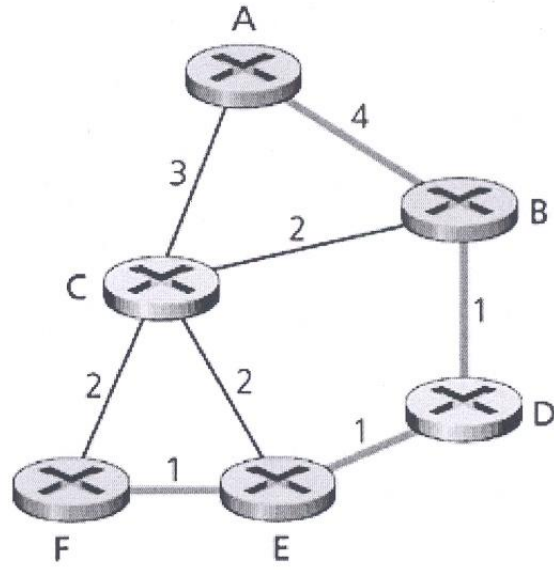
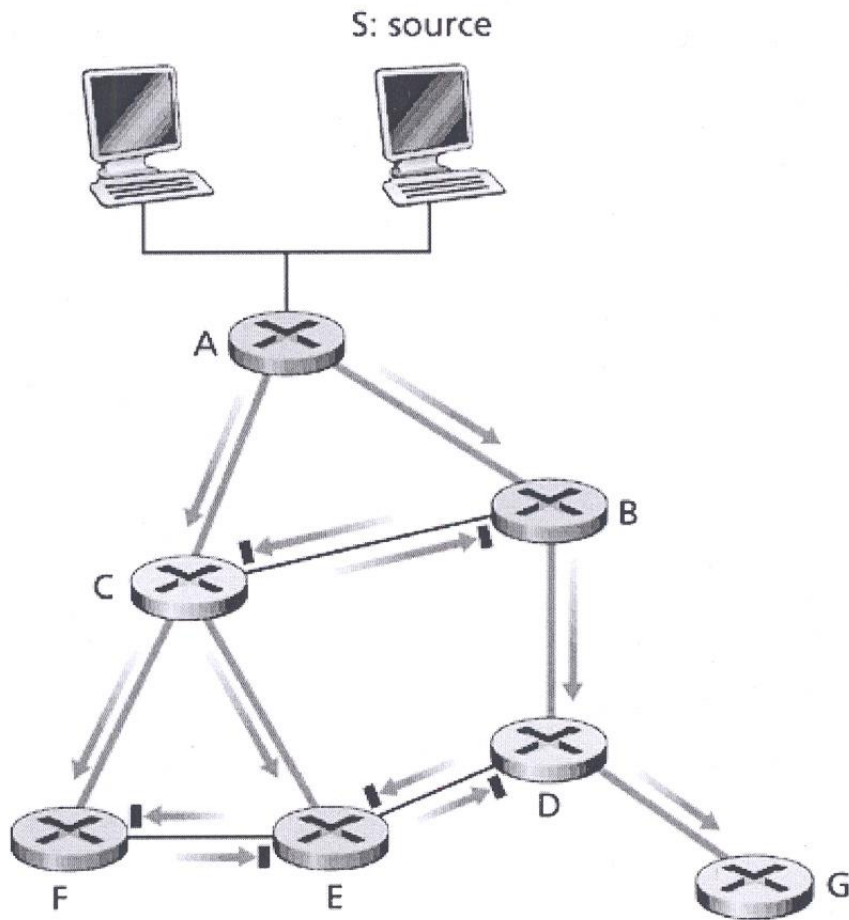


Figure Part2-1



Key:

→ pkt will be forwarded

→| pkt not forwarded beyond receiving router

Figure Part2-2

6. Consider the Go-Back-N protocol with a sender window size of 3 and a sequence number range of 1,024. Suppose that at time t , the next in-order packet that the receiver is expecting has a sequence number of k . Assume that the medium does not record messages. Answer the following questions:
- a. What are the possible sets of sequence numbers inside the sender's window at time t ? Justify your answer. 5%
 - b. What are all possible values of the ACK field in all possible messages currently propagating back to the sender at time t ? Justify your answer. 5%
7. Describe the role of DNS in a content distribution network. 5%