

「資訊網路」博士班資格考

CLOSE BOOK，考試時數 4 小時

第一部分：

1. What is the hybrid TCP/IP-OSI standards architecture? (4%)
3. a) Distinguish between omnidirectional and dish antennas in terms of operation. (2%)  
b) When would you use an omnidirectional antenna? (1%)  
c) When would you use a dish antenna? (1%)
3. a) What problem do VLANs address? (2%)  
b) Describe the VLAN tagging standard. (2%)
4. a) What are the three ways in which IP telephony saves money? (2%)  
b) Besides saving money, what do companies find attractive about VoIP? (2%)
5. a) Describe ADSL speeds and technology. (3%)  
b) Does ADSL disable your telephone line when you are using the Internet? (1%)
6. a) Why is PPTP attractive? (Give two reasons.) (2%)  
b) What is the main advantage of IPsec tunnel mode? (1%)  
c) What is the main limitation of IPsec tunnel mode? (1%)
7. a) How many TCP segments are necessary to open a connection?. (2%)  
b) Explain TCP error correction. (2%)
8. a) What does NAT do with arriving packets and TCP segments? (2%)  
b) What are private IP addresses? (2%)
9. Distinguish between making demand projections and conducting what-if analyses about possible changes the network. (4%)
10. a) What secure communication system is used widely in e-commerce? (2%)  
b) Describe how DMZs provide security in e-commerce. (2%)
11. a) A transport process announces an MSS of 1,024. If there are no options, how big can IP packets be? (2%)  
b) How is fiber quality expressed? (2%)  
c) Which 802.11 versions can support the elimination of workgroup hubs and switches? (2%)

- d) What type of multiplexing does a T1 line use? (2%)  
e) Why does ATM have high overhead? (2%)

第二部分：

1. Consider the two ways in which communication occurs between a managing entity and a managed device: request-response mode and trapping. What are the pros and cons of these two approaches, in terms of (1) overhead, (2) notification time when exception events occur, and (3) robustness with respect to lost messages between the managing entity and the device? 5%
2. Consider the KDC and the CA servers. Suppose a KDC goes down. What is the impact on the ability of parties to communicate securely; that is, who can, and cannot, communicate? Justify your answer. Suppose now that a CA goes down. What is the impact of this failure? 5%
3. How is the interarrival time jitter calculated in the RTCP reception report? 10%
4. In mobile IP, what effect will mobility have on end-to-end delays of datagrams between the source and destination? 5%
5. In CSMA/CD, after the fifth collision, what is the probability that a node chooses  $K = 4$ ? The result  $K = 4$  corresponds to a delay of how many seconds on a 10 Mbps Ethernet? 5%
6. Why would the token-ring protocol be inefficient if a LAN had a very large perimeter? 5%
7. What is the difference between a group-shared tree and a source-based tree in the context of multicast routing? 5%
8. Suppose there are  $N$  active peers in the Gnutella network, and each pair of peers has an active TCP connection. Additionally, suppose that the TCP connections pass through a total of  $M$  routers. How many nodes and edges are there in the corresponding overlay network? 5%
9. What is meant by a handshaking protocol? 5%