101 學年度第 1 學期 博班資格考 資訊網路試題

命題方式：close book　　考試時間：共 4 小時

第一部分：50 分(每題 10 分)

1. a) When a layer creates a message, what does it usually do immediately afterward? b) What does the layer below it usually do after receiving the next-higher-layer message? c) What is encapsulation? d) With Web communication using HTTP, what message does IP encapsulate in packet data fields? e) What are the two steps after a layer process creates its layer message?

2. a) What are the two benefits of MIMO? b) What will be 802.11n's rated speed? c) In what two ways does 802.11n increase throughput? d) What are the two attractions of 5GHz 802.11n operation? e) What is the advantage of dedicating channels to VoIP service?

3. Several Internet access systems are asymmetric, with higher downstream speeds than upstream speeds. a) Is this good for client PC access to webservers? Explain. b) Does it matter for client access to e-mail servers? c) Is it good for a file server? Explain. d) Is it good for videoconferencing? Explain.

4. Assume that an average SNMP response message is 100 byes long. Assume that a manager sends 40 SNMP Get commands each second. a) What percentage of a 100 Mbps LAN link's capacity would the resulting response traffic represent? b) What percentage of a 128-kbps WAN link would the response messages represent? c) What can you conclude form your answers to parts (a) and (b) of this question?

5. a) How does a receiving internet layer process decide what process should receive the data in the data field of an IP packet? b) How does TCP decide? c) How does UDP decide? d) How does PPP decide?

第二部分：50 分(每題 10 分)

6. Consider some of the pros and cons of virtual-circuit and datagram networks.

a.) Suppose that in the network layer, routers were subjected to stressful conditions that might cause them to fail fairly often. At a high level, what actions would need to be taken on such router failure? Does this argue in favor of VC or datagram architecture?

b.) Suppose that in order to provide a guarantee regarding the level of performance

(for example, delay) that would be seen along a source-to-destination path, the network requires a sender to declare its peak traffic rate. If the declared peak traffic rate and the existing declared traffic rates are such that there is no way to get traffic from the source to the destination that meets to required delay requirements, the source is not allowed access to the network. Would such an approach be more easily accomplished within a VC or a datagram architecture?

7. In CSMA/CD, after the sixth collision, what is the probability that a node chooses K=4? If the result K=100 corresponds to delay of how many seconds on a 10 Mbps Ethernet? And how many seconds on a 100 Mbps Ethernet?

8. Suppose an 802.11b station is configured to always reserve the channel with the RTS/CTSS sequence. Suppose this station suddenly wants to transmit 1,000 bytes of data, and all other stations are idle at this time. As a function of SIFS and DIFS, and ignoring propagation delay and assuming no bit errors, calculate the time required to transmit the frame and receive the acknowledgement.

9. Suppose hosts A and B are separated by 10,000km and connected by a direct link of R=1 Mbps. Suppose the propagation speed over the link is 2.5*108 m/sec. How long does it take to send a 400K bits file? Suppose the file is broken up to 4 packets and each packet is ACKed by the receiver and the transmission time is negligible. Assume sender cannot send a packet until the preceding one is ACKed. How long does it take to send the file?

10. Consider the following network (Figure 1). With the indicate link costs, use Dijkstra's shortest path algorithm to compute the shortest path from U to all nodes. Show how the algorithm works by computing a table.

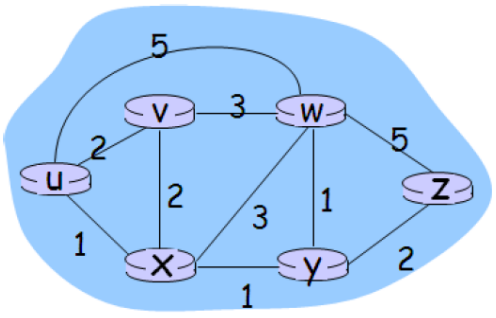

Figure 1