

The test consists of **five** questions (each worth 20 points). You **must** answer the **three** Required Questions and any **two** of the Optional Questions. Put all your answers in blue books with your name on each book and indicate on the outside which question is in each book.

If you answer more than two of the optional questions, you **must indicate the two you want to be graded.**

Three Required Questions [answer ALL three questions]

- 1 a. Describe and explain CSFQ, AVQ and XCP.
b. Explain the difference between the efficiency and fairness controllers in XCP.
c. Discuss three performance measures that can be used to compare these three congestion control strategies.
d. Discuss the advantages and disadvantages of these mechanisms with respect to handling Web traffic, UDP traffic, and traffic with specific Quality of Service requirements.
- 2 a. Explain briefly the difference between Dynamic Source Routing (DSR) and Destination-Sequenced Distance Vector (DSDV) used in wireless ad-hoc networking.
b. Describe the three metrics used to measure the routing protocols and how each of these measurements relate to ad-hoc networking.
c. Discuss the impact of routing overhead on TORA and AODV.
- 3 a. Describe how firewalls and intrusion detection systems operate.
b. What are the advantages and disadvantages of detection of DOS beyond the perimeter ?
c. Explain how direct and reflector DDoS attacks work.
d. Briefly discuss the Distributed Attack Detection Approach.

Six Optional Questions [answer ANY two questions]

- 4 a. Explain why drop tail routers are unfair to Mice as compared to Elephants.
b. Explain the RIO-PS scheme.
c. Discuss the key strategy proposed in the "Mice and Elephants" paper.
d. How does this improve performance?
e. In what circumstances could the proposed strategy not improve performance?
- 5 a. What does it mean for a flow to be TCP-Friendly, and why is this important in the Internet today?
b. Explain the concept of unresponsive flows.
c. Explain two forms of congestion collapse.
d. What techniques can be used to determine disproportionate bandwidths?

- 6 a. Explain how TCP Westwood differ from TCP Reno.
 - b. How does TCPW achieve better utilization for wireless links?
 - c. Compare TCPW and TCP Reno in terms of friendliness and fairness.

- 7 a. What are the key results of the paper by Fu et al?
 - b. Explain the distributed LRED algorithm.
 - c. Explain the advantages of Adaptive Pacing.

- 8 a. What are the various components of the secure overlay solution?
 - b. How does it provide more protection than the traditional methods of network security?
 - c. What overhead is there in the overlay approach?

- 9 a. Describe some network protocols/events that make traceback of a single IP packet complicated.
 - b. Briefly describe the three parts of the SPIE architecture and how they fit into an ISP network
 - c. Why is only a packet digest stored and not the entire packet header?