Network Exam 1 Review Sheet

1. What is a host? Are there more hosts on the internet or non-host network nodes? How do you know?
2. What is a protocol?
3. Bandwidth – what does it define, why is it something of a misnomer?
4. Compare and contrast a statistical multiplexed (packet switched) vs. a statically multiplexed network. How are they different? What are the advantages and disadvantages of either? What are two classes of static multiplexing?
5. How long does it take a packet of length 1000 bytes to propagate over a link distance of 2500 km, propagation speed (*s*) of 2.5x10^8m/s, and transmission rate of 2mbps?
6. What is an ISP? What different types of ISPs exist?
7. What are Internet Exchange Points (IXPs) and Points of Presences (PoPs)?
8. How does the Traceroute command work?
9. What are two advantages of having a layered network? What about two disadvantages? What are the layers in the Internet model? In the OSI 7 layer model?
10. Suppose users share a 2Mbps link. Also suppose each user transmits continuously at 1Mbps when transmitting, but each user transmits only 20% of the time.
    1. When circuit switching is used, how many users can be supported?
    2. When packet switching is used, how many users can be supported?
    3. What is the probability a given user is transmitting at any time?
11. What are the advantages of a P2P model over a client server model? Disadvantages?
12. What is a socket?
13. What does TCP provide that UDP does not? Which is more impactful on the network?
14. In general, what does an HTTP message between 200 and 299 mean?
15. What are the advantages and disadvantages of persistent vs. non-persistent HTTP? Which would I want to use for a large, one-time file transfer?
16. What is the difference between IMAP and POP?
17. What roles may a Super Node play in a P2P network?
18. Give a high level overview of the operation of SMTP from client and server perspectives.
19. Give a high level overview of how DNS works. Make sure to include the concept of a Root and TLD domain server. Why do root servers exist?
20. Explain, at a high level, the code flow in C or Python of a socket connection and sending/receiving data. What types of sockets can be created and used?
21. Explain the differences between stop-and-wait, go-back-N, and selective repeat reliable transfer mechanisms.
22. What is the difference between flow control and congestion control? Why do both exist?
23. Understand how a TCP 3-way handshake works and what initialization is performed.
24. Suppose you have a 1Gbps link and two hosts separated on this link at 100ms RTT. How much data (in Bytes) will need to be “in-flight” to achieve full utilization using TCP as a transport?
25. Explain TCP’s congestion control operation. What are AIMD, slow start, congestion avoidance? How does a sender respond by adjusting its congestion window and slow start threshold based on inferred loss events?
26. Explain at a high level the operation of fast retransmit and fast recovery in TCP. Why are they useful compared to the alternative?