

CS:352 Fall 19 Final

30 Questions on 6 Pages for 100 pts. 2 pts Each for First 20 Questions. 6 pts Each for Last 10.

1. List Five Layers of Internet Protocol Stack & Seven Layers of ISO/OSI Reference Model

2. List Three Network Metrics

3. List Four Examples of Application Layer Protocols

4. List Two Key Difference between Clients and Servers in the Client-server architecture

5. List the Difference between Nonpersistent HTTP and Persistent HTTP

6. List Two Key Differences between TCP and UDP

7. List the mechanism of TPC Establish and Tear-down A connection

8. List Formulas for Smoothed Round Trip Time (SRTT) & Retransmission Timeout (RTO)

9. List the Key Difference between Go-Back N and Selective Repeat

10. List Key Difference between Flow Control and Congestion Control

11. List the Key Difference between TDMA and FDMA
12. List Two Different IP Support Protocols and their Key Functions.
13. List Three Broad Classes of MAC Protocols
14. List Three Key Differences between MAC and IP addresses
15. List both one Difference and one Similarity between a Switch and a Router
16. List the Key Difference of CSMA/CD and CSMA/CA
17. List the Key Difference between Indirect Routing and Direct Routing in Mobility Approaches
18. List the Key Difference between (i) 2G and 3G as well as (ii) 3G and 4G LTE Cellular Network
19. List the Two Requirements for Public Key Encryption Algorithms
20. List Three Approaches of Network Support for Multimedia

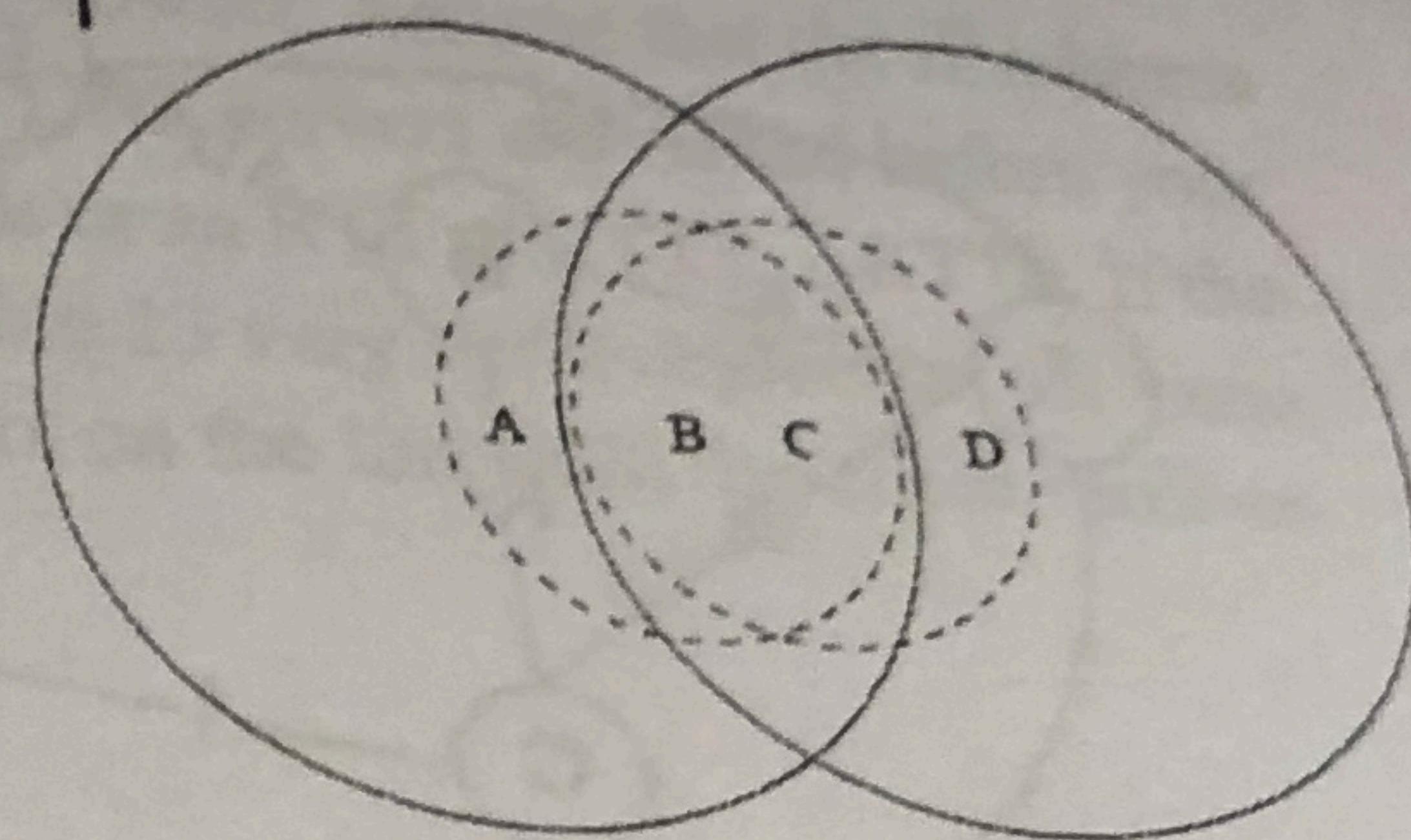
21. Please finish the following figure for DHCP IP address allocation where the client selects the IP address from Server 1.

Server 1

Client

Server 2

22. Consider the wireless topology on the right. The solid circles represent the transmission radius of nodes A and D, respectively, and the dashed circles represent the transmission range of B and C. In these problems, assume that losses only occur due to collisions. list the potential hidden terminals and exposed terminals when
- (i) A is transmitting to B



- (ii) B is transmitting to A

- (iii) A is transmitting to C

- (iv) D is transmitting to B

- (v) C is transmitting to B

- (vi) B is transmitting to C

23. Consider the GO back N protocol with a sender window size of 6 and a sequence number from 1. At some time t, the receiver sends an acknowledgment for 13 (received all 13). What are the possible sequence numbers of packets in the sender's window at time t?

27. Suppose you click on a link to obtain a Web page in your Web browser. Assume that the IP address for the associated URL is not cached in your local host, and 6 DNS servers are visited before your host receives the IP address from DNS; the successive visits incur an RTT of RTT₁,...,RTT₆. If the Web page associated with the link contains a HTML referencing 13 very small objects on the same server, how much time it will take from when the client clicks on the link until the client receives 13 objects assuming

(i) we use persistent HTTP connection without pipelining?

(ii) we use non-persistent HTTP with 5 parallel connections?

28. Please give the values of N, SEQ, ACK, and WIN in the packets based on the TCP Flow Control Protocol and Interactions between Sender and Receiver.

- Number of bytes in packet (N)
- Sequence number of first data byte in packet (SEQ)
- Sequence number of next expected byte (ACK)
- Window size at the receiver (WIN)

