Problem #1

*Why do HTTP, SMTP, and POP3 run on top of TCP rather than UDP?*

All these protocols, one for web applications and the other two for mail applications, need proper arrival of data and transmitting data without losing information. These protocols and their applications cannot tolerate data loss; thus, TCP is implemented. If some applications and their application level protocols can tolerate data loss, then UDP would be a better option because it provides an unreliable data transfer service.

Problem #2

*Is it possible for an organization’s Web server and mail server to have exactly the same alias for a hostname (for example, foo.com)? What would be the type of the RR that contains the hostname of the mail server?*

Yes, it is possible to have the same alias for a hostname. A MX RR contains the hostname of the mail server.

Problem #3

*In BitTorrent, suppose Alice provides chunks to Bob throughout a 30-second interval. Will Bob necessarily return the favor and provide chunks to Alice in this same interval? Why or why not?*

There is a possibility that Bob does not return the favor and provide chunks to Alice in this same interval because Bob only supplies data to his top four peers and Alice might not be a top four peer. Also, if Bob does not receive data from Alice at a faster rate than his top four peers, then Bob will not be satisfied with the trading and will not consider sending data to Alice.

Problem #4

*Besides network related considerations such as delay, loss, and bandwidth performance, there are other important factors that go into designing a CDN server selection strategy. What are they?*

Important factors for designing a CDN will be infrastructure, cost of infrastructure and services, available throughput, possibility of software and hardware failure, Internet Service Provider delivery cost, amount of information stored on every on server clusters, amount of network ISP, and geographic location.

Problem #5

Amount of time needed to get the IP address for the associated URL will be the sum of RTT from 1 to n. In example, RTT1 + RTT2 + … + RTTn. After the IP address is found, then it will take a RTT0 to make the TCP connection, then it will take another RTT0 to get the HTML text, and since the transmission time of the object is zero, then we do not take it into account. Then, the total time it elapses from when the client clicks on the link until the client received the object is 2RTT0 + RTT1 + RTT2 + … + RTTn.

Problem #6

*Suppose you can access the caches in the local DNS server of your department. Can you propose a way to roughly determine the Web servers (outside your department) that are most popular among the users in your department? Explain.*

It is possible to know which Web servers are the most popular among the users in my department. I will keep track of the DNS caches in the local DNS servers. The Web servers that appear more in the DNS caches in the local DNS servers are the most popular servers because it is the users will be requesting them more. The more it is requested, then it will be cached more frequently.