Computer Networks – Assignment 2

Network Layer:

1. Explain Router architecture briefly.
2. Discuss Three switching techniques in switching fabric.
3. Compare Virtual circuit and Datagram networks with diagrams.
4. Explain Fragmentation and also three fields related to fragmentation.
5. Briefly explain IPv4 addressing w.r.t classful and classless addressing.
6. Write a note on following:
   a. Subnet b. CIDR c. DHCP d. ICMP
7. Describe Dijkstra's algorithm briefly with example.
8. Describe Bellman-ford algorithm briefly with example.
9. Compare Distance vector and Link state routing protocols.
10. Illustrate Hierarchical routing with diagram.
11. Explain Classless addressing and its restrictions and also show how these restrictions satisfy the address by taking an example? Find the First, Second and Number of addresses in the following IPv4 address block 205.16.37.39/28.
12. An ISP is granted a block of addresses starting with 190.100.0.0/16(65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows:
    a) The first group has 64 customers each needs 256 addresses.
    b) The second group has128 customers each needs 128 addresses.
    c) The third group has 128 customers each needs 64 addresses.

    Design the sub-blocks and find out how many addresses are still available after these allocation.
13. What is NAT. Explain briefly?
14. With neat diagram explain the format of IPv4 Datagram?
15. With neat diagram explain the IPv6 Packet format?
16. Compare IPv4 and IPv6.
17. Explain any 2 strategies to make transition from IPv4 to IPv6.
18. Briefly explain IPSec and its services.
19. Explain Intra-AS and Inter-AS routing protocol.
20. Write a note on following: a) OSPF b)BGP
21. Explain the following with respect to broadcast routing:
    a. Uncontrolled flooding
    b. Controlled flooding
    c. Spanning-Tree Broadcast
22. What is multicast routing? Explain multicast routing with respect to IGMP protocol.
23. Write a note on DVMRP protocol.

Transport Layer:

24. Explain the following with respect to reliable data transfer(rdt) with neat FSM(6M each)
    a. Reliable data transfer over a perfectly reliable channel : rdt1.0
    b. Reliable data transfer over a channel with Bit Errors : rdt2.0
    c. Handling corrupted ACKs and NAKs : rdt2.1
    d. Reliable data transfer over a lossy channel with Bit Errors: rdt3.0
25. What is ABP? Explain the operations of rdt3.0 through alternating-bit protocol.
26. Explain the operations of Go-Back-N (GBN) pipelined error recovery mechanism.
27. Explain the operations of Selective Repeat (SR) pipelined error recovery mechanism.
28. With neat diagram, explain the TCP segment structure.
29. Explain briefly TCP connection management.
30. Consider steaming stored audio. Does it make sense to run the application over UDP or TCP? Which transport protocol does RealTimeNetworks use? Why?
31. With a diagram, explain the causes of congestion with few scenarios.
32. Briefly explain different approaches to congestion control.
33. Consider the GBN and SR protocols. Suppose the sequence number space is of size k. What is the largest allowable sender window that will avoid the occurrence of problems for each of these protocols?
34. Answer true or false to the following questions and briefly justify your answer:
    a. With the SR protocol, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.
    b. With GBN, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.
    c. The alternating-bit protocol is the same as the SR protocol with a sender and receiver window size of 1.
    d. The alternating-bit protocol is the same as the GBN protocol with a sender and receiver window size of 1.