

**BITS, Pilani-Dubai ,
International Academic city
III Year Second Semester 2007-08
Degree:B.E.(Hons) Branch:C.S.E
COURSE NO. : CS UC461**

Computer networks

Date:28th may 2008 **Total marks=65 (closed book) Weightage=40%**
Comprehensive exam **Answer all the questions Time- 3 hrs**

Part-B (5 *10=50)

Q1.a) Suppose a TCP message that contains 2048 bytes of data and 20 bytes of TCP header is passed to IP for delivery across two networks of the Internet (i.e., from the source host to a router to the destination host). The first network where the source lies uses 14-byte headers and has a MTU of 1024 bytes; the second network where the destination lies uses 8-byte headers with a MTU of 512 bytes. (Each network's MTU gives the total packet size that may be sent, including the network header.) Also, recall that the IP header size is 20 bytes. Schematically depict the packets that are delivered to the network layer at the destination host assuming IPV4.(6M)

b) Outline the differences in fragmentation of IPV4 compared with IPV6.(4M)

Q2.a) Assume that BITS-Pilani has been assigned Class C address as 210.93.45.0 by the ISP. Using that our System admin wants to create 6 subnets in our college one for each dept in BITS. How many hosts can be connected to each dept subnet for internet connectivity? Assign the IP address allocation for the systems in every dept.(10M)

Q3. a) I want to provide individual internet connectivity to 4096 nodes in an organization. I want to adopt a particular scheme so that I can incorporate good address space usage efficiency as well as minimum entries in routers table across the internet to forward packets to the organization. Justify a methodology to implement the same. How many nodes theoretically I can connect to each network ? Draw the diagram for the above implementation.(6M)

b)

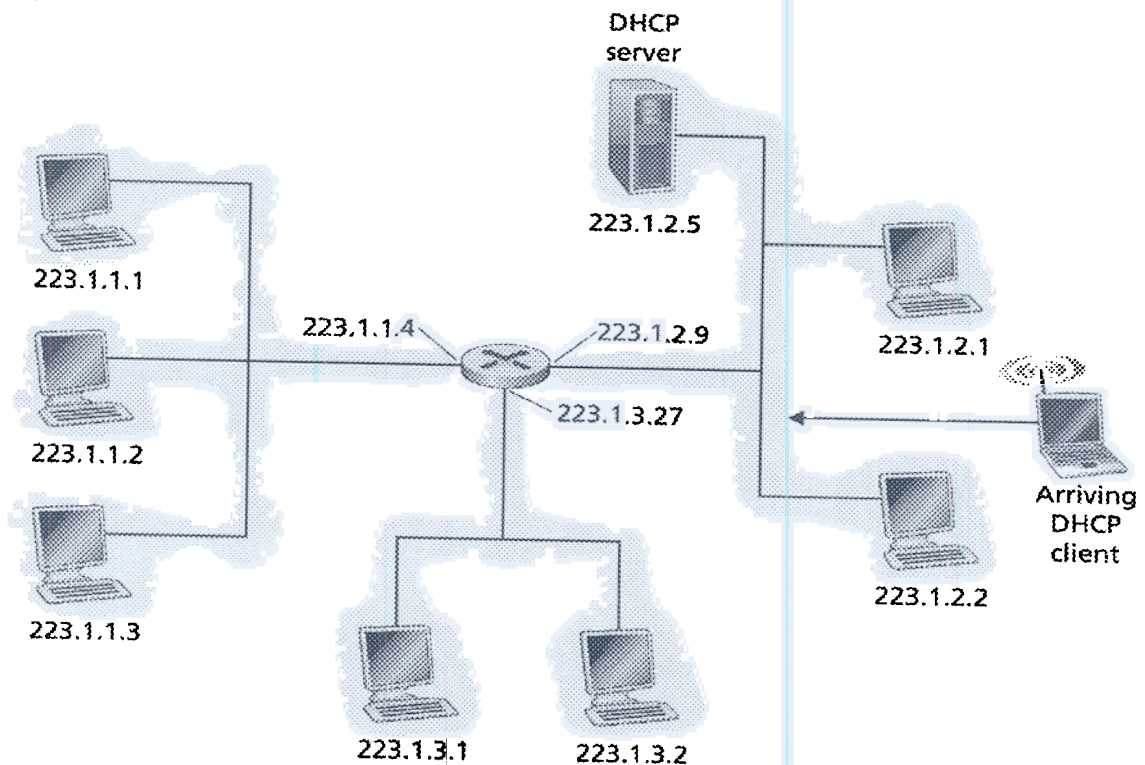


Figure 5.20 ♦ DHCP client-server scenario

Assume that a DHCP client enters via the network of node 223.1.1.1 (from left). List out the steps involved in discovering the DHCP server by the client (4M)

Q4.a) Outline the difference in behavior when multiple UDP clients connecting to UDP server compared to multiple TCP clients connecting to TCP server. (3M)

b) With the help of an example outline how flow control is achieved between sender and a receiver via TCP? (7M)

Q5.a) Compare the performance of ATM networks with circuit switched and datagram switching networks (4M)

b) Using AAL5 show the situation where (6M)

- 1) No padding is required
- 2) 40 bytes of padding required
- 3) 47 bytes of padding required

Part -A

All questions carry equal marks (5*3=15M)

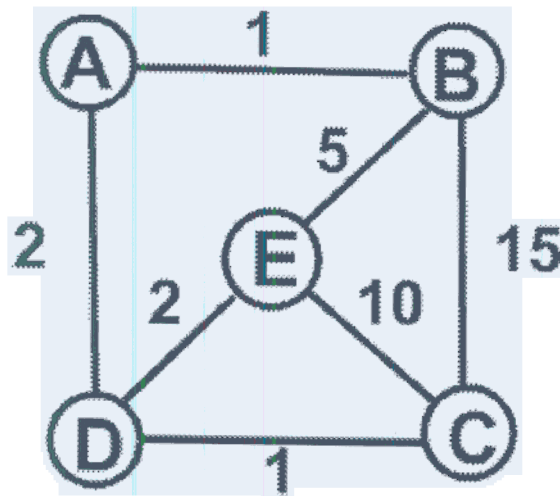
Q1. I want to monitor the health of networks across internet and do appropriate corrective mechanism. Design a mechanism to do the same.

Q2. A host with IP address 130.23.3.20 and physical address B23455102210 has a packet to send to another host with IP address 130.23.43.25 and physical address A46EF45983AB. The two hosts are on the same Ethernet network. Show the ARP request and reply packets encapsulated in Ethernet frames

Q3. Briefly outline the extra features needed for Mobile IP compared to Conventional non mobile IP networks.

Q4. Consider the network shown below and assume that each router A,B,C,D and E initially knows the costs to each of its neighbors. The networks lie between routers.

- Consider the distance vector algorithm and show the distance vector table entries at node E.
- suppose the link between D and C got broken .Now specify how the entries in table at E gets modified



Q5 Justify how hybrid cryptography is better than Symmetric and asymmetric cryptographies?

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TEST-2 Computer networks

Test1 Date: 20-4-08

Total marks=20 (open book) Weightage=20%

Answer all the questions

Q1.a) Consider a broadcast channel with 3 nodes and a transmission rate of 1 Mbps. Suppose the broadcast channel uses polling (with an additional polling node) for multiple access. Suppose the amount of time from when a node completes transmission until the subsequent node is permitted to transmit is 100 m.sec. Suppose that within a polling round, a given node is allowed to transmit at most 1500 bits. What is the maximum throughput of the broadcast channel. (3M)

b) How do you compare the above approach with CSMA/CD? (3M)

Q2. Suppose a host has a 1 MB file that is to be sent to another host via a medium. The file takes 1 sec of CPU time to compress 50% or 2 seconds to compress 60%. Calculate the bandwidth of the medium at which each compression option takes the same total compression + Transmission time. (3M)

Q3. Suppose two nodes, A and B are attached to opposite ends of a 900 m cable, and that they each have one frame of 1000 bits (including all headers and preambles) to send to each other. Both nodes attempt to transmit at time $t=0$. Suppose there are four repeaters between A and B, each inserting a 20 bit delay. Assume the transmission rate is 10 Mbps, and CSMA/CD with backoff intervals of multiples of 512 bits is used. After the first collision, A draws $K=0$ and B draws $K=1$ in the exponential backoff protocol. Ignore the jam signal and the 96-bit time delay.

a) What is the one-way propagation delay (including repeater delays) between A and B in seconds. Assume that the signal propagation speed is $2 * 10^8$ m/sec. (2M)

b) At what time (in seconds) is A's packet completely delivered at B. (3M)

Q4. Suppose a point to point link is being set up between earth and a new lunar colony. The distance from the moon to earth is approximately 385000 K.M and data travels over the link at the speed of light $3 * 10^8$ m/sec.

A camera on the lunar takes pictures of Earth and saves them in digital format to disk. Suppose mission control on earth wishes to download the most current image which is 25MB. What is the minimum amount of time that will elapse for the transfer to complete assuming a three way handshake is initiated by mission control on earth to initiate the data transfer. (4m)

Q5) Suppose nodes A and B are on the same 10 Mbps Ethernet segment, and the propagation delay between the two nodes is 225 bit times. In the worst case collision between A and B what should be minimum size of the frame from A to implement CSMA/CD successfully in the above scenario. (2m)

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TEST-1

Test1 Date: 9-3-07

Total marks=25 (closed book) Weightage=25%

Answer all the questions

Q1. With the help of an example outline the usage of session layer in OSI network protocol stack (4M)

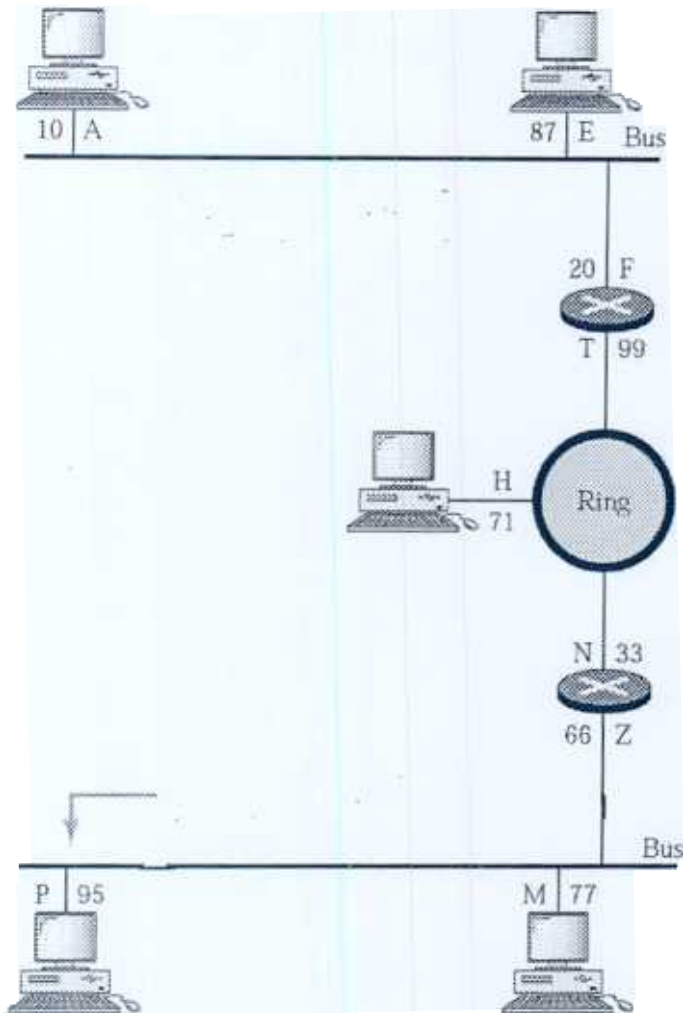
Q2. a) With relevant diagrams outline the difference between TDM and FDM for voice traffic. (4M)

b) How does multiplexing affect the carrier of multiplexed voice channels in TDM as well as FDM? (2M)

Q3. In the given diagram the integers represent the MAC addresses of the computers whereas the alphabets like A, E, F, T, H, N, Z, M and P represent IP addresses.

a) Outline how a datagram packet is formed and routed between E and M (4M)

b) Outline how a datagram packet is formed and routed between A and H (2M)



Q4.

With relevant diagram outline the sequence of steps involved in getting a web page called `index.html` from the root directory of a web server `www.google.com` by a web browser. (4M)

Q5a)) Outline clearly the difference between TCP and UDP sockets based communication. (3M)

b) Specify the type of information you prefer for sending via the UDP socket and justify the same. For the above information what will happen if you use TCP sockets? (2)