

Computer Networks

Paper code: IT-601

Time: 3 hours

Branch: IT

Full Marks: 70

Answer any FIVE Questions

1.
 - a. What are the properties of virtual circuit networks?
 - b. Draw and explain the frame format of Frame Relay.
 - c. Draw a diagram to show the ATM cell header.
 - d. Discuss about virtual channels and virtual paths.

3 + 4 + 3 + 4

2.
 - a. Draw the header format of IPv6.
 - b. Consider two computers A and B are attached in an Ethernet LAN. The IP address and hardware address of computer A are 197.15.3.2 and 0A:07:4B:12:82:36 (in Hex). The IP and hardware addresses of computer B are 197.15.3.3 and 0A:9C:28:71:32:8D, respectively. Computer A broadcasts an ARP message to know the hardware address of computer B, and computer B replies to computer A. Show with the help of a suitable diagram the ARP messages sent by computer A and computer B.
 - c. Suppose computer A wants to send a message of length 2000 bytes (including transport and application headers) using IPv4. What are the contents of following fields of the datagram, if MTU of the network is 1500 bytes?

version

Total length

Identification

DF, MF

Fragment offset

2 + 6 + 6

3.
 - a. Consider a CSMA/CD network running at 1 Gbps over a 10-km cable with no repeater. The signal speed in the cable is 200,000 km/sec. What is the minimum frame size?
 - b. In an FDDI with 100 stations, the token has been lost between the station 52 and 53. At what station and how will this loss of token be detected?
 - c. In a 100 Mbps and 100 km FDDI, the speed of propagation is 2×10^8 m/s. Calculate the physical length of a bit.
 - d. A DQDB MAN has six stations A, B, C, D, E and F connected in that order. Three stations become ready to transmit and send requests in-order of C, E and B. Construct the virtual queue table and explain how they are made to transmit in order.

3 + 3 + 2 + 6

4. *a.* What do you mean by internetworking?
b. Why does count-to-infinity problem not appear in Link State Routing?
c. What are the advantages of flooding?
d. Write short notes on - /. RIP. *ii.* NAT, *Hi.* DHCP .

$$2 + 4 + 2 + (2 + 2 + 2)$$

5. *a.* Which fields of TCP header are involved during *three-way handshaking!* Show the values of those fields during the handshaking.
b. How does TCP achieve reliability though the underlying communication is unreliable?
c. In a TCP header, the header length field is reading 1001 and the total length field is reading 00001000 00100100. Calculate the length of application data.
d. Draw the header format of UDP.
e. How can the route between two hosts be traced using ICMP? Explain.

$$4 \ 4 \ 2 + 2 + 2 + 4$$

6. *a.* Can you construct a Computer Network in a single layer? If yes, what are the disadvantages to do so? If not, state the reasons.
b. How many addresses are normally used in a computer network? Can you construct a computer network with a single type of address? If yes, what kind of problem can be faced? If no, state the reasons.
c. In case of hierarchical routing, like CIDR, is it possible to design a router that computes the next hop in hardware instead of looking at routing table? If yes, propose the outline of such design. If not, state reason.
d. A and B are the only two stations on an Ethernet. Each has a steady queue of frames to send. Both A and B attempt to transmit a frame, collide and both then participate in back-off race. However^ they again collide. Find the probability that A will win in second back-off race.

$$3 + 3 + 4 \ f \ 4$$

7. *a.* A token ring LAN running at 16 Mbps, has a THT of 10 ms. It has two frames ready for transmission, one having the length of 1056 bytes, and the other of 555 bytes. Can it send any one or both frames in the THT?
b. Show (diagrammatically) the Token Ring frame format.
c. Why does a bridge constantly update its entries, and purge an entry even if it is only a few minutes old?
d. How is collision avoided in a switched LAN?
e. A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle?

$$4 + 2 + 3 + 3 + 2$$