Sample Questions on Link Layer

1) What are some of the possible services that a link-layer protocol can offer to the network layer? Which of these link-layer services have corresponding services in IP and TCP?

2) Show by a virtue of an example other than the one in Figure 5.6 of the textbook that two-dimensional parity checks can correct and detect a single bit error. Also, show an example of a double-bit error that can be detected but not corrected.

3) Why would the token passing protocol be inefficient if a LAN had a very large perimeter?

4) How big is the MAC address space, the IPv4 address space and the IPv6 address space?

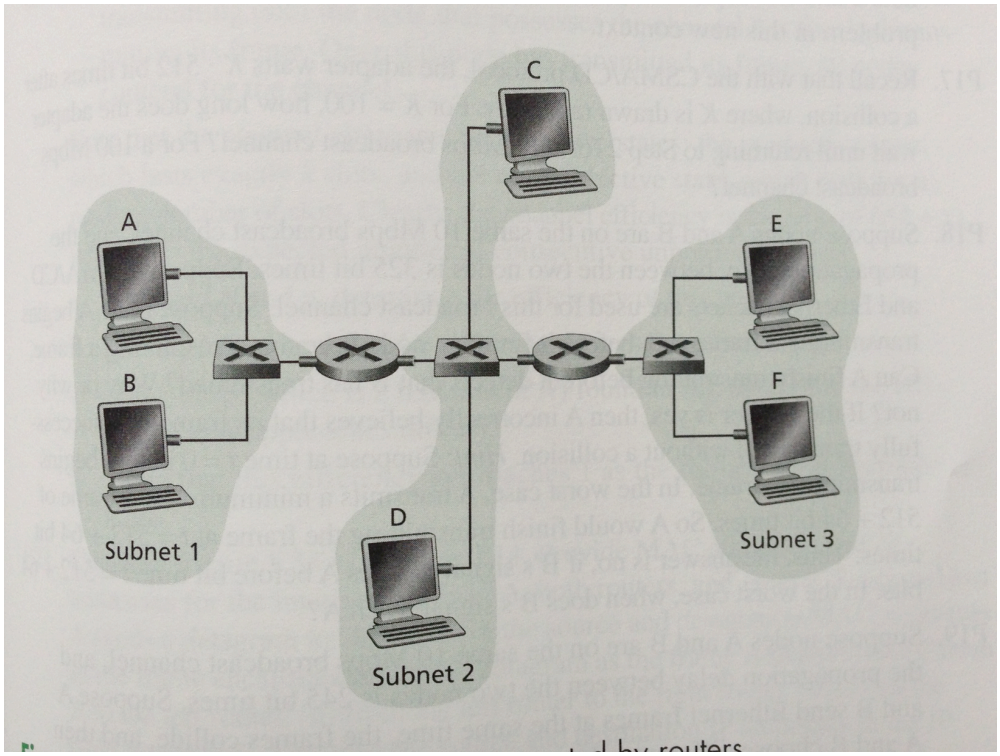
5) Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with a specific destination MAC address?

6) In CSMA/CD, after the fifth collision, what is the probability that a node chooses *K=4*? The result *K=4* corresponds to a delay of how many seconds on a 10Mbps Ethernet?

7) Suppose nodes A, B and C each attach to the same broadcast LAN through their adapters, If A sends thousands of IP datagrams to B with each encapsulating frame addressed to the MAC address of B, will C's adapter process these frames? If so, will C's adapter pass the IP datagrams in these frames to C (that is, the adapter's parent node)? How would your answers change if A sent frames with the MAC broadcast address?

8) Consider the three LANs interconnected by two routers, as show in the figure below.

(a) Assign IP addresses to all of the interfaces. For Subnet 1 use addresses of the form 192.168.1.xxx; for Subnet 2 use addresses of the form 192.168.2.xxx; and for subnet 3 use addresses of the form 192.168.3.xxx.
(b) Assign MAC addresses to all of the adapters.
(c) Consider sending an IP datagram from Host E to Host B. Suppose all of the ARP tables are up to date. Enumerate all the steps, as done for the single-router example in Section 5.4.1 of the textbook.
(d) Repeat (c), now assuming that the ARP table in the sending host is empty (and the other tables are up to date)


C
A
E
B
F
D
Subnet 1
Subnet 3
Subnet 2