1. Why is it much easier to send a signal which is a smooth function down a transmission line than to send a signal which has jump discontinuities?

2. Television sub-channels are 6-MHz wide. How many bits/second can be sent if four-level digital signals are used? Assume a noiseless channel.

3. What signal-to-noise ratio is needed to put a T1 carrier on a 50-KHz bandwidth line?

4. What is the essential difference between circuit switching and packet switching?

5. Assume that four CDMA stations use the following “chips”:
   A: (-1 -1 -1 +1 +1 -1 +1 +1),
   B: (-1 -1 +1 -1 +1 +1 -1 -1),
   C: (-1 +1 -1 +1 +1 +1 -1 -1),
   D: (-1 +1 -1 -1 -1 +1 +1 -1),
   and the CDMA receiver gets the chips (-1 +1 -3 +1 -1 -3 +1 +1). Which bits did each station send?

6. In a normal RS-232 serial connection to a terminal, the key codes (in ASCII) for the keys that the user types are sent to the host. Assuming that line-edited mode (or “cooked mode”) is being used, the host echoes them back to the terminal where they appear on the screen. What is the advantage to doing it this way? Why not just have the terminal do a local echo of these characters to the screen?

7. Some Wide Area Network (WAN) protocols are said to be “connection-oriented” (e.g. DECNET, X.25) whereas others are said to be “connectionless” (e.g. the Internet network layer IP protocol). What is the crucial difference between these two types?

8. You are getting hacker probes from some host in the 209.9.224.* (class C) network. Which of the following command lines will find the Start Of Authority for this domain and why?
   dig soa 224.9.209.in-addr.arpa
   dig soa 209.9.224
   ping 224.9.209.in-addr.arpa

9a. You are logged into our pegasus and are trying to do an ftp to an anonymous ftp site, say ftp.beavis.butthead.com
   Suppose you get the message
   ...unknown host ftp.beavis.butthead.com
   What is likely to be the problem and what can you do?

9b. Suppose, instead, that you get the message
   Trying 208.207.151.35 ...
   and this stays on the screen for some time, until the attempt times out with
   ...Connection timed out.
   What is different about this type of failure (as opposed to that of problem above)? What is likely to be the problem and what can you do?

10. In order to test a transmission line’s response to a periodic waveform, it is sufficient to find out how it transmits each pure frequency (e.g. sin nt or cos nt). Why is this the case?