1. The C/No of a space communication link is being discussed in class. A student claims that C/No can be increased by merely utilizing the antennas at a higher carrier frequency. Do you agree?

2. A satellite uplink operating at 14.2 GHz utilizes a 6 foot transmit antenna and a 4 foot receive antenna. The transmit antenna pointing error is .1 degrees and the receive antenna pointing error is .2 degrees. Calculate the antenna pointing losses.

3. Use the data presented in class to determine the rain loss for a satellite downlink with ground station located in Los Angeles. The link operates at 12GHz and the ground station antenna elevation angle is 30 degrees. Assume 99.99% availability.

4. A satellite ground station located in Los Angeles communicates with a satellite in geosynchronous orbit with satellite subpoint equal 100 deg W. Calculate the slant range and ground station look angles.

5. A partially completed satellite communication system link budget is shown in Table 1 below. Complete the budget and find the required uplink transmit power assuming BPSK is utilized to transmit 10 Mbps at a BER of $1 \times 10^{-7}$. Assume all the antennas are parabolic reflectors with 60% efficiency. Furthermore, assume the demod/bit sync implementation loss is 1.5 dB and that a link margin of 3 dB is required. Show your calculation for the value of Eb/No that corresponds to the required BER.

6. In problem (5) above, suppose one wishes to reduce the derived uplink transmitter power by 3 dB. What would you modify in the link design?

7. In problem (5) above, suppose one doubles the data rate and reduces the BER to $1 \times 10^{-5}$. Find the required uplink transmitter power.