

## CHAPTER 5: MULTIPLE ACCESS TECHNIQUES

### **Problem 1..**

Explain, in your own words, the distinction between user information bit rate and transmission rate. In particular, show that the GSM user rate is 22.8 kbps while the transmission rate is 270.833 kbps. Calculate the corresponding information bit rates and transmission rates for IS-136 (D-AMPS)

### **Problem 2..**

The CDMA system IS-95 speech encoder operates at a bit rate of 9.6 kbps. Find the spreading gain if the chip rate is 1.2288 Mchips/sec. How many chips per bit does this represent? Superimpose a sketch of a sequence of chips on top of a sequence of bits.