Home work 1
WCM607

Explain why power control is so important in CDMA systems.

A transmitter uses binary pulse code modulation (BPSK) system to transmit digital data. In this scheme the binary information are represented by 0 or 180 degree phase shifts of a tone. Assuming that the transmitter data rate is 10 Kbps, calculate

a. The bit time.
b. Energy per bit if the transmitter power is 2 W.

A certain digital system requires an E_b/N_0 of 3 dB at the receiver for an acceptable performance. The system is using spread spectrum technology and has a bandwidth of 3.75 MHz. The path loss for the channel is given as

$$PL = 72 + 30 \log(d)$$

Where PL is path loss in dB and d is the distance from the transmitter to the receiver in meters.

a) Calculate SNR for this system for transmit data rates of 10, 100, and 1000 Kbps.
b) Calculate the path loss for 500 and 1000 meters.
c) Discuss the impact of the range on the data rate delivered to the user equipment (UE).