1. Define PN Sequences. Draw a 16-bit Fibonacci linear-feedback shift register. If the seed is 1010110011100110. Find the PN sequences for four rounds. 8
2. State some gains of Spread Spectrum Multiple Access technique. Whether CDMA is a Direct Sequence Spread Spectrum system or not? Explain 8
3. If the bandwidth for 8-QAM and 8-PSK is BW=2Rb/3, then i) what is the bandwidth of 16-QAM and 16-PSK? ii) If a bit stream of 64 kb/s is to be transmitted, how much bandwidth is required in each case? 12

iii) How many symbols are represented (M) for 8-QAM and 16- QAM modulation?

iv) How many bits per symbol are used (K) for 8-PSK and 16-PSK?

v) If the Baud is 10000 symbols/s, what is bit rate (Rb) for 8-QAM and 16-QAM?

vi) Draw the signal constellation diagram for both 16-QAM and 16-PSK.

1. Explain “near-far” problem. 6
2. Types of frequency hopping are: (i) Slow frequency hopping (ii) Fast frequency hopping. Explain both. 6
3. Define Cell Capacity of a TDMA System. Now calculate the capacity and spectral efficiency of a TDMA system using the following parameters: bandwidth efficiency factor *η*b= 0.9, bit efficiency (with 8 PSK) *µ*=3, voice activity factor *vf* =1.0, one-way system bandwidth *Bw* =12.5 MHz, information bit rate R =16.2 kbps, and frequency reuse factor N = 19. 8