2020 EBU5302 Week Four Problems

1. For MFSS, with $f_c = 250kHz$, $f_d = 25kHz$ and M=8, list all the frequency assignments for each of the data combinations. What is the data rate?

2. A system transmits at 30 kbps, sending 3 bits per symbol. The time between hops for a FHSS system is 0.125ms. Is the system using slow-frequency-hop spread spectrum or fast-frequency-hop spread spectrum?

3. A multilevel digital communication system sends of 16 possible levels over the channel every 0.8ms?
    1) what is the number of bits corresponding to each level?
    2) What is the baud rate?
    3) What is the bit rare?

4. If the received signal level for a particular digital system is -151dBW and the receiver system effective noise temperature is 1500 K, what is E_b/N_0 for a link transmitting 2400bps?

5. In a simple free-space radio propagation model, the received signal power is proportional to $1/d^4$, where d is distance. Calculate the interfering power from the co-channel cells in a 7-cell cluster (P_{i7}) and compare it with the interfering power in a 3-cell cluster – i.e. evaluate P_{i7}/P_{i3} in dB. Assume the cell radius is the same in each case.