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# 10EC61 – Digital Communication

## Assignment-III

- Note: i) Write the assignment in a A4 size paper  
ii) Mention your USN, name and section on the top right corner of first page  
iii) Submit the assignment on or before 11.00 AM, Tuesday, 23/05/2017  
iv) Answer All questions from part A and any four from part B
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### Part -A

1. Sketch BFSK transmitter and receiver (both coherent and non-coherent). Derive an expression for probability of error in BFSK.
2. Explain QPSK with relevant waveforms, signal space and block diagrams.
3. With a neat block diagram explain DPSK. Illustrate the generation and detection of differentially encoded sequence for the data 100011010
4. Explain frequency hop spread m-ary frequency shift keying with a neat block diagram and illustrate the slow frequency hopping (with frequency hopping diagram).
5. Find the average probability of error for coherent QPSK modulation system.
6. What is the role of PN sequence in spread spectrum communication? For the given PN sequence 0011101 verify the properties of it.

### Part-B

7. What is MSK? Also briefly explain Phase tree and phase trellis in MSK.
8. Define processing gain and jamming margin.
9. Discuss briefly the applications of spread spectrum to i) CDMA and ii) Multipath Suppression
10. What are the advantages of MSK over QPSK
11. Binary data is transmitted over an AWGN channel at a rate of  $(2.4) \times 10^6$  bits/sec using an ASK signalling method. The carrier amplitude at the receiver antenna is 1 mv and the noise power spectral density at the receiver input is  $10^{-15}$  watt/Hz. Find the error probability of a coherent receiver. (Hint:  $\text{erfc}(5)=3 \times 10^{-6}$ ).
12. Compare probability of symbols for basic digital modulation formats and explain how the probability of error depends on the distance between message points in the space diagram.