



B.L.D.E. ASSOCIATION'S  
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15EC61

OR

- 4 a. Explain the correlation receiver with neat diagrams and explanation of detector and the maximum-likelihood decoder blocks. (08 Marks)
- b. Explain the matched filter receiver. Obtain the expression for the impulse response of the matched filter. (08 Marks)

### Module-3

- 5 a. Derive the expression for error probability of binary PSK using coherent detection. (06 Marks)
- b. Binary data are transmitted over a microwave link at the rate of  $10^6$  bits/sec and the power spectral density of the noise at the receiver input is  $10^{-10}$  W/Hz. find the average carrier power required to maintain an average probability of error  $P_e \leq 10^{-4}$  for the following cases.  
Binary PSK using coherent detection  
DPSK  
Note : take  $\text{erfc}(2.63) = 2 \times 10^{-4}$ ,  $Q(3.7) = 10^{-4}$ . (06 Marks)
- c. Define bandwidth efficiency. Tabulate and comment on the bandwidth efficiency of M-ary PSK signals for different values of M.

OR

- 6 a. With neat diagram and expressions, explain binary FSK generation and detection scheme. (06 Marks)
- b. Explain the generation and optimum detection of differential phase-shift keying with neat block diagram. (06 Marks)
- c. What is the advantage of M-ary QAM over M-ary PSK system? Obtain the constellation of QAM for  $M = 4$  and draw signal space diagram. (04 Marks)

### Module-4

- 7 a. With a neat block diagram, explain the digital PAM transmission through band limited baseband channels. Also obtain the expression for inter symbol interference. (06 Marks)
- b. Explain the modified duo-binary signaling scheme, with pre-coding. Illustrate the encoding for the binary sequence "011100101". Assume previous pre-coder outputs as 1. (07 Marks)
- With neat diagram, explain the timing features pertaining to eye diagram and its interpretation for baseband binary data transmission system. (03 Marks)

OR

- 8 a. With neat sketches and expressions, explain raised cosine spectrum solution to reduce ISI. (06 Marks)
- b. What is the advantage of controlled ISI partial response signaling scheme? With block diagram, explain the duo-binary encoder with pre-coder. Mention the frequency response, impulse response and its features. (06 Marks)
- c. With neat diagram and relevant expressions, explain the concept of adaptive equalization. (04 Marks)