

Exam.Code:0932

Sub. Code: 6631

2023

B.E. (Electronics and Communication Engineering)

Eighth Semester

EC-809: Advanced Digital Communication

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- a) A certain low pass bandlimited signal $x(t)$ is sampled and the spectrum of the sampled version has the first guard band from 1500Hz to 1900Hz. How will you determine the sampling frequency and the maximum frequency of the signal?
- b) Give the expression for the threshold and bit error probability of matched filter.
- c) How does wireless channel differ from its wired counterpart?
- d) Define the parameters of an eye diagram in a typical communication channel.
- e) State the principle behind decision feedback equalization. (5x2)

UNIT - I

- II. a) With a neat sketch, explain the modulation and detection of 8-PSK.
b) Compare binary signalling schemes and M-ary Signalling Schemes. (2x5)
- III. a) Explain the quadrature sampling of band pass signal with related block diagram, spectra and equations.
b) With block diagram, explain the principle of detection and estimation. (2x5)
- IV. a) Explain the function of correlation receiver. (3)
b) Show that the probability of bit error of a matched filter receiver is given by
$$P_e = 1/2 \operatorname{erfc} \sqrt{E_b/N_0}$$
 (3)
c) A binary data is transmitted using ASK over a AWGN channel at a rate of 2.4 Mbps. The carrier amplitude at the receiver is 1mV. The noise power spectral density $N_0/2 = 10^{-15}$ watt/Hz. Find the average probability of error if the detection is coherent. Take $\operatorname{erfc}(5) = 3 \times 10^{-5}$. (4)

P.T.O.

(2)

UNIT - II

- V. a) Discuss the causes of ISI and ways to overcome it. Also state and explain the Nyquist condition for zero ISI. (5)
- b) How does peak power problem influence OFDM system? (2)
- c) Assess the performance of PAPR reduction using coding and scrambling. (3)
- VI. Write short notes on:-
- a) Frequency selective channel estimation in OFDM.
- b) Raised cosine spectrum (2x5)
- VII. a) Compare and contrast zero forcing equalizer and decision feedback equalizer.
- b) Draw a neat schematic of decision feedback equalizer and explain its principle in detail. Bring out its design details. (2x5)

x-x-x