1E9202

Roll No.

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M. Tech. I Sem. (Main & Back) Exam. Jan.-Feb. 2014

1MDC2 Digital Communication System

Time: 3 Hours

Maximum Marks: 100

Min. Passing Marks: 33

Instructions to Candidates:-

*Attempt any **five** questions.*

Marks of questions are indicated against each question. Draw neat and comprehensive sketches wherever necessary to clearly illustrate your answer. Assume missing data suitably if any and specify the same.

Use of following supporting material is permitted during examination.
(Mentioned in form No.205)

1._____ 2._____

Q.1 (a) A DS spread spectrum system of chip rate 10 MHz is used for ranging. If the reflected wave is received after 0.1 millisecond, find the probable distance of the target. [10]

(b) Which of DS and FH spread spectrum is prone to near-far problem? If N flip-flops are used to generate the PN sequence and Tc the chip period, what is the maximum time after which the PN sequence repeats it- self? [10]

Q.2 Explain the following in brief - [4x5]

(a) Overlapping of spectra of BPSK signals leads to which of inter channel or inter symbol interference? [5]

(b) Can we say that QPSK signals are in time quadrature while MSK signals are in frequency quadrature? [5]

(c) Is it true, that in matched filter, error probability depends on signal energy and not on wave shape? [5]

(d) Does bit synchronization problem affect signal and noise equally? [5]

Q.3 (a) How does the phase difference with local signal affect correlator based coherent detection of PSK? Also comment on bit probability of error for PSK and QPSK. [10]

(b) Find upper limit of error probability in optimal reception of 16 –PSK, 16 – QASK, orthogonal 16 – FSK. Given, energy associated with per bit = 5×10^{-8} J and power spectral density of white noise at input 10^{-9} W/ Hz. [10]

Q.4 (a) With the assistance of a block diagram, describe the function of a 16–QAM modulation scheme. [10]

(b) State the difference between coherent and non – coherent detection. Also sketch the phase-state diagram of a QPSK modulator. [10]

Q.5 (a) Calculate the error probability P (e) of a 16–QAM modulation scheme for $E_b/N_0 = 7$ dB. [10]

(b) List the differences and similarities of the PSK and QAM modulation schemes. [10]

Q.6 (a) What are the fundamental components determining BPSK error performance and how are they related? [10]

(b) Explain evaluating procedure for probability of error of the matched filter [10]

Q.7 (a) Find if the value of a is fixed where probability distribution function of x is defined as $f_x(x) = ae^{-0.2x}$ for $x \geq 0$ and zero elsewhere. [10]

(b) With the help of neat diagram, explain the working of a pseudo–random sequence generator. [10]

Q.8 Write short notes on any two of the following - [10×2]

(a) Courier and symbol synchronization.

(b) Spectrum of FH– spread spectrum.

(c) Duo binary encoding

(d) Signal space representation of MSK

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