GANPAT UNIVERSITY

M. Tech. Semester -I (EC) Regular Examination, JAN 2013

Advanced Digital Communication (3EC 103)

Max. Time: 3 Hrs.] [Max. Marks: 70

Instructions:

1. Attempt **all** questions.
2. Answers to the **two** sections must be written in **separate** answer books.
3. Figures to the **right** indicate full marks.
4. **Assume** suitable data, if necessary.

SECTION –I

1	A	What is mean by orthogonal and orthonormal signal? Explain noncoherent detection for FSK using Quadrature receiver and envelope detectors.	8
	B	What is the theoretical minimum system bandwidth needed for a 15 Mbits/s signal using 16-level PAM without ISI?	3
2	A	Consider a coherent orthogonal MFSK system with M=8 having the equally- likely waveforms $Si(t) = A\cos 2\pi fit,,$ i=1…,M,$0 \le T \le T$,where T=0.2ms.the received carrier amplitude, A is 1mv, and the two sided AWGN spectral density, No/2, is 10^{-11} W/Hz. Calculate the probability of bit error, $P_{b.}$	6
	B	Derive the equation for P_b for antipodal signal.	4
	C	Differentiate the amplifier and repeater.	2
		OR	
2	A	Differentiate the the matched filter and correlation receiver.	3
	B	Assume that the equally- likely RZ binary pulses are coherently detected over a Gaussian channel with $No=10^{-8}$ W/Hz. Assume that this synchronization is perfect and that the received pulses have an amplitude of 100 mv. If the bit error probability specification is $P_{b.}=10^{-3}$. Find the largest rate that can be transmitted using this system.	6
	C	Consider a 16-ary PSK system with symbol error probability $P_e = 10^{-5}$. A gray code is used for the symbol to bit assignment. What is the approximate bit error probability?	3
3	A	Explain the generation and detection of BPSK using block diagram.	6
	B	What is role of matched filter in digital communication system? Also derive the equation for impulse response for it.	6
		OR	
3	A	Explain the block diagram of a typical digital communication system.	6
	B	Derive the minimum bit energy, E_b to noise spectral density, $N_0/2$, to achieve a BER equal to 10^{-5}. For BPSK and Polar baseband signal.	6

SECTION-II

4	A	Explain the frequency and phase synchronization sing PLL.	6
	B	Explain the QPSK receiver using necessary waveforms and block diagram	6
5	A	Explain the receiver for detection of DPSK signal.	4
	B	Explain the traditional ciphers in detail.	3
	C	Explain the different types of open loop bit synchronizers.	5
		OR	
5	A	Define the Cipher and public key	2
	B	What is basic goal for the communication system designer? Also explain the bandwidth-efficiency plane using necessary chart.	5
	C	Write short note on CDMA and TDMA.	5
6	A	Explain the basic steps in the demodulation/detection of digital signals.	5
	B	Derive the equation for bit error for Non-coherently detected binary orthogonal FSK.	6
		OR	
6	A	Explain the Trellis Coded Modulation in detail.	7
	B	Explain the reception of MSK using block diagram and necessary waveforms.	4