TE – Sem-VI – CBGS – EXTC – DC

10/5/16

QP Code : 31640

(3 Hours) **[Total Marks : 80**

N.B.

1] Question no.1 is compulsory
2] Attempt any **three** questions out of remaining **five** questions
3] Assumptions made should be **clearly** stated
4] Illustrate answers with **sketches** wherever **required**

Q.1		Attempt any **four**	
	a	Describe the Shanon-Hartley capacity theorem.	5
	b	Consider a binary data sequence 10101010.Draw the waveforms for the given binary data sequence, using unipolar RZ and split phase Manchester.	5
	c	State two criteria which a spread-spectrum communication system must satisfy. Justify that the spread-spectrum signals are transparent to the interfering signals, and vice-versa.	5
	d	Explain the Coherent and non coherent digital modulation techniques.	5
	e	Define code rate, code efficiency, systematic and non systematic in the context of linear block code.	5
Q.2			
	a	Consider the five source symbols of a discrete memoryless source and their respective probabilities as 0.4, 0.2, 0.2, 0.1, and 0.1. i) Create a Huffman Tree for Huffman source coding technique to find the codeword and length of codewords for each source symbol. ii) Determine the average codeword length of the specified discrete memoryless source. iii) Comment on the results obtained	10
	b	Describe in convolution code, Time domain approach, and Transform-domain approach to determine encoder output.	10
Q.3			
	a	Justify that the probability of error in matched filter does not depend on the shape of input signal. Derive the relevant expression.	10
	b	For a Quadrature Phase Shift Keying (QPSK), Explain the modulator, demodulator, Bandwidth and advantages.	10
Q.4			
	a	Describe coherent detection method of binary FSK signals. Also draw power spectra for BFSK modulated signal.	10
	b	In a digital communication system, the bit rate of a bipolar NRZ data sequence is 1 Mbps and carrier frequency of transmission is 100MHz. Determine the symbol rate of transmission and the bandwidth requirement of the communications channel for i) 8-ary PSK system ii) 16-ary PSK system.	10
Q.5			
	a	The Generator matrix of (6, 3) systematic block code is given below: $G = \begin{bmatrix} 100011 \\ 010101 \\ 001110 \end{bmatrix}$ Find the code Vectors, parity check matrix, and the error syndrome.	10

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	b	A (7, 4) cyclic code is described by a generator polynomial $$g(x) = x^3 + x + 1$$ i) Find out the generator matrix
		    ii) Parity checks matrix.
		    iii) Draw the syndrome calculator and explain how received message is corrected?
			10

Q.6		**Attempt the following (any two).**	
	a	Write short note on Intersymbol interference (ISI) and .	10
	b	Explain with the help of block diagrams and waveforms, the following techniques of spread spectrum communication. (a) Direct sequence (b) Frequency hopping.	10
	c	What are different decoding methods of convolutional codes? Explain any one in detail.	10

Course: T.E. (SEM.-VI) (REV.-2012) (CBSGS) (E&TC ENGG.) (Prog-T3126)

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Correction:

ETC 12,13,14,15,16,17,18,19
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1st flr   2nd flr

The Q6 a) should be read as follows

Q6 a) Write short note on Inter symbol interference. (10 marks)

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