Code No: RT32043 **R13** SET - 1

III B. Tech II Semester Supplementary Examinations, November - 2017

DIGITAL COMMUNICATIONS

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1	a)	Explain natural Sampling and Flat-top Sampling.	[3M]
	b)	Explain the reconstruction process of a message from its samples	[4M]
	c)	If the Nyquist samples are quantized to L = 65, 536 levels and then binary coded, determine the number of bits required to encode a sample.	[4M]
	d)	Draw the NRZ and RZ code for the digital data 10110001	[4M]
	e)	What is the need for geometric representation of signals?	[3M]
	f)	Compare the error probability for BPSK and QPSK.	[4M]

PART -B

2	a)	What are the disadvantages of uniform quantization over the non-uniform quantization? Explain.	[8M]
	b)	Consider a DM system designed to accommodate analog message signals limited to a bandwidth w=5KHz. A sinusoidal test signal of amplitude A=1 volt and frequency fm=1KHz is applied to the system. The sampling rate of the system is 50KHz. (i) Calculate the step size required to minimize slope overload. (ii) Calculate the signal to quantization noise ratio of the system for the specified sinusoidal test signal.	[8M]
3	a)	Explain the working of BPSK modulation and Demodulation	[8M]
	b)	Explain non-coherent detection methods of binary frequency shift keying scheme.	[8M]
4	a)	What is correlator? Explain the optimum filter reception using correlator.	[8M]
	b)	Derive the probability error of BFSK system and explain its operation.	[8M]
5	a)	An analog signal band limited to 10HKz quantize 8-levels of PCM System with probability of 1/4,1/5,1/4,1/10,1/20,1/10,1/20 and 1/10 respectively. Find the entropy and rate of information.	[8M]
	b)	If X represents the outcome of a single roll of a fair die. What is the entropy of X?	[8M]
6	a)	Apply Shanon-Fano coding to the source with 8 emitting messages having probabilities ½,3/20,3/20,2/25,2/25,1/50,1/100 and 1/100 respectively, and find the coding efficiency.	[8M]
	b)	Explain the Huffman coding in detail along with example.	[8M]

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7 a) Consider (7, 4) linear code whose generator matrix is- [8M]

$$G = \left[\begin{array}{cccc:ccc} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{array}\right]$$

(i) Find all code vectors of this code.
(ii)Find the parity check matrix for this code.
(iii) Find the minimum weight of this code.

b) Explain the procedure of Binary cyclic codes with one example. [8M]

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