Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION(S), DECEMBER 2019

Course Code: EC302

Course Name:Digital Communication

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks Marks

1 a) Derive the expression for the normalised power of quantization error in a PCM system with uniform quantization. (8)

b) Explain how eye pattern is used to study the performance of a data transmission system? (7)

2 a) The signal $x(t) = cos(200\pi t) + 0.25cos(700\pi t)$ is sampled at a rate of 400 samples per second. The sampled waveform is then passed through an ideal low pass filter with 200Hz bandwidth. Write the expression for the filter output. Sketch the frequency spectrum of the sampled waveform. (7)

b) Evaluate the power spectral density of unipolar NRZ code. Plot the spectrum. (8)

3 a) Explain the need for a pre-coder in a duo-binary signalling system. For the given input binary data 1011101, obtain the output of the duobinary encoder. Explain how the data can be detected at the receiver. (8)

b) With necessary expressions, explain the practical difficulties encountered in ideal Nyquist channel & how they are overcome by raised cosine filters. (7)

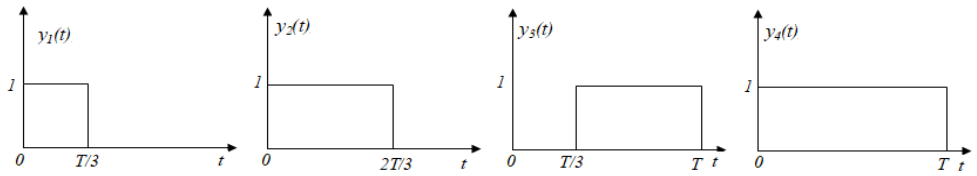
PART B

Answer any two full questions, each carries 15 marks

4 a) Explain in detail, the principle of correlation receiver. (7)

b) With the help of diagrams, explain the working of BPSK transmitter &receiver. (8)

5 Consider the signals $y_1(t), y_2(t), y_3(t) \& y_4(t)$ given below. (15)



Find the orthonormal basis for these set of signals using Gram-Schmidt orthogonization procedure.

6 Derive the expression for probability of error in BFSK. (15)

PART C

Answer any two full questions, each carries 20 marks

7	a)	Explain the importance of PN sequence in spread spectrum communication.Differentiate between fast frequency hopping and slow frequency hopping.	(10)
	b)	What are diversity techniques? Explain how they are implemented intime, space& frequency.	(10)
8	a)	Explain the techniques for generation of PN sequences. What are the properties of PN sequences?	(10)
	b)	Derive the expression for processing gain of MFSK. A fast frequency hopping MFSK system has the following parameters. Number of bits per MFSK symbol=8, Number of hops per MFSK symbol= 8. Calculate the processing gain.	(10)
9	a)	Explain the difference between coherence bandwidth and coherence time.	(4)
	b)	Discuss synchronisation techniques.	(6)
	c)	With relevant block schematic, explain how a RAKE receiver can improve theperformance of CDMA communication system.	(10)

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