

Reg. No.:

Name :



VIT

Vellore Institute of Technology

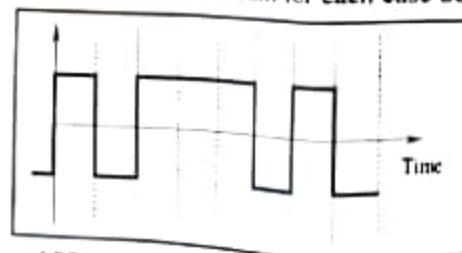
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Continuous Assessment Test I – May 2023

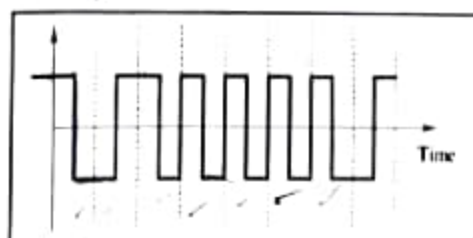
Programme	B.Tech (ECE)	Semester	FALL INTER
Course	Digital Communication Systems	Code	2022-23
		Class Nbr	BECE3061
			C H2022232501205
			C H2022232500086
			C H2022232500083
			C H2022232500082
			C H2022232501206
			C H2022232500085
Faculty	Dr. Havarasan T. Dr. Ralph Thangaraj Dr. Nirmala P. Prof. M.Krithika alias AnbuDevi Dr. Vipul Dixit Dr. S. Usha Rani	Slot	D1
Time	90 Minutes	Max. Marks	50

Answer ALL the questions

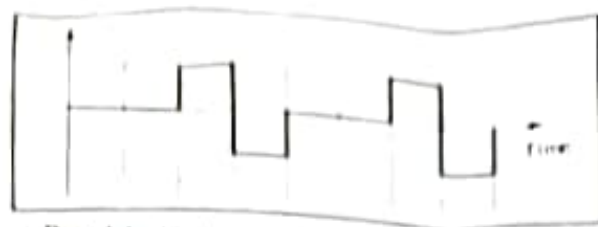
Q.No.	Sub. Sec.	Questions	Marks
4.		Find the Nyquist rate and the Nyquist Interval for the following signals: $g_1(t) = \text{sinc}(200t) + \text{sinc}^2(200t)$ $g_2(t) = \text{sinc}(300t) \cdot \text{sinc}(400t)$	[5+5]
4.		A television signal with a max frequency of 5 MHz is transmitted using binary PCM. The number of quantization levels is 2048. Compute (i) code word length (ii) Transmission bandwidth (iii) Average output SNR and (iv) Bit rate.	[10]
4.		A communication engineer wants to transmit the human voice signal at the encoded rate of 1 bit/sample. Identify the waveform coding technique, explain the encoder and decoder operation with suitable diagram and mathematical analysis. Also, explain the drawback associated with the technique and give the solution to overcome that. Find the 8-bit data stream for each case depicted in figure-	[10]



a. NRZ-I



b. Differential Manchester



c. Pseudoternary

5. (a) For the applications described, make a choice for a line coding scheme. To justify your choice, you need to analyse the requirements of the application, the properties of your choice with respect to the requirements and what makes it best suited when compared with other line codes for the application- [5]

"A gas sensor is part of a DIY (do-it-yourself), pollution measurement kit, built by students as part of a mini-project. This sensor is connected by wires to a microcontroller. The sensor outputs digital, formatted data. Choose a line coding scheme for this."

- (b) A cheap telephone handset manufacturer uses an ADC to generate digital signals from human speech. Assume that the input signal from the microphone is sampled and then passed through an anti-aliasing filter before being quantized and encoded. Should the manufacturer choose a sampling rate close to Nyquist rate or should the sampling be done at rates much greater than Nyquist? Answer this from the perspective of the design of the anti-aliasing filter. [5]

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