

Thapar Institute of Engineering & Technology, Patiala

Department of Electronics and Communication Engineering

UEC639 – Digital Communication

B. E. (Third Year): Semester-V (ENC)

Solution Tutorial-5

Q1	With the help of proper mathematical expressions, explain the concept of inter-symbol interference at the receiver of a digital communication system. Also explain the reason of ISI.																																													
Solution	Refer ppt uploaded on LMS																																													
Q2	Explain the Nyquist criteria for distortion less baseband transmission in time-domain. Use this expression the derive Nyquist criteria for distortion less baseband transmission in frequency domain																																													
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Q3	A communication channel of bandwidth 100 kHz is required to transmit binary data at a rate of 0.1 Mb/s using raised cosine pulse shape. Determine the roll-off factor α .																																													
Solution	Bandwidth = $\frac{Rb}{2} * (1 + \alpha)$ $(1+ \alpha) = 100* 1000 *2 / (0.1 *1000*1000)$ $\alpha = 1 ;$																																													
Q4	What is the difficulties of ideal solution of pulse shaping for distortion less baseband transmission? How practical solution solve those difficulties. Explain with proper mathematical and graphical concept.																																													
Solution	Refer ppt uploaded on LMS																																													
Q5	For an input bit sequence 1001101, determine the output “c(k)” of duobinary coder with and without precoding. Then apply the decision rule to obtain the output binary sequence for both cases.																																													
Solution	Without precoder $C(k) = a(k) +a (k-1)$ <table><tr><td>k</td><td>a(k)</td><td>a(k-1)</td><td>c(k)</td><td></td></tr><tr><td>1</td><td>1 +1 V</td><td>0 (assume) --- -1V</td><td>0</td><td></td></tr><tr><td>2</td><td>0 -1 V</td><td></td><td></td><td></td></tr><tr><td>3</td><td>0 -1 V</td><td></td><td></td><td></td></tr><tr><td>4</td><td>1 +1 V</td><td></td><td></td><td></td></tr><tr><td>5</td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>	k	a(k)	a(k-1)	c(k)		1	1 +1 V	0 (assume) --- -1V	0		2	0 -1 V				3	0 -1 V				4	1 +1 V				5																			
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