

CSE3213 Communication Networks, Winter 2010 Section: M Instructor: Foroohar Foroozan

Time Allowed: 15 minutes

Quiz 2

Student Name: ____Instructor Solution_____

Student Number: _

1. PCM [1 point]

Given the quantization levels in the following figure, write down the PCM output levels (for t=0-4 [sec]) of the presented signal. Sign bits: + is 0, - is 1. Sampling times Ts = 1 [sec].



2. Improving channel capacity [2 points]

We need to upgrade a channel to a higher bandwidth. Answer the following questions:

(a) How is the rate improved if we double the bandwidth?

$\mathbf{C} = \mathbf{B} \log 2 \left(1 + \mathbf{SNR} \right)$

Clearly, by doubling the bandwidth (2B), the capacity (i.e. data rate) is doubled.

(b) How is the rate improved if we double the SNR?

C' = B log₂ (1 + 2*SNR) = \approx B log₂ (2*SNR+) \approx \approx B log₂ (2) + B log₂ (SNR) \approx \approx B + C