



DEPARTMENT OF ELECTRONICS &  
COMMUNICATION  
Digital Communication (Code: ECEM-101)



Date: 14/09/2017 Deadline: Monday (18/09/17) Morning *Homework 2 for M.Tech (CIT) ECE (I Sem)*

1. A signal  $g(t) = \text{sinc}^2(5\pi t)$  is sampled (using uniformly spaced impulses) at a rate of: (i) 5Hz; (ii) 10 Hz; (iii) 20 Hz. For each of the three cases:
  - (a) Sketch the sampled signal
  - (b) Sketch the spectrum of the sampled signal
  - (c) Explain whether you can recover the signal  $g(t)$  from the sampled signal.
  - (d) If the sampled signal is passed through an ideal low-pass filter of bandwidth 5Hz, sketch the spectrum of the output of the signal
2. Problem number 6.2 from the Book Digital communication by Simon Haykin.
3. Problem number 6.3 from the Book Digital communication by Simon Haykin.
4. Problem number 6.14 from the Book Digital communication by Simon Haykin.
5. Problem number 6.15 from the Book Digital communication by Simon Haykin.
6. A message signal  $m(t)$  is transmitted by binary PCM. If the SNR (Signal-to-quantization-noise ratio) is required to be at least 47 dB, determine the minimum value of  $L$  required, assuming that  $m(t)$  is sinusoidal. Determine the SNR obtained with this minimum  $L$ .