

Roll No.

Total Pages : 04

BT-6/M-19 36110

DIGITAL COMMUNICATION
ECE-306N

Time : Three Hours

[Maximum Marks : 100]

Note : Attempt Five questions in all, selecting at least one question from each Unit. All questions carry equal marks.

Unit I

(b) Explain any *one* method of decoding of convolutional codes. Draw all the stages of viterbi decoding. 8

Unit II

3. (a) Explain the sampling process and its importance in pulse modulation. 6

(b) Specify the Nyquist rate and the Nyquist interval for each of the following signals : 3+3+3

 - $g(t) = \text{sinc}(200t)$
 - $g(t) = \text{sinc}^2(200t)$
 - $g(t) = \text{sinc}(200t) + \text{sinc}^2(200t)$

4. (a) Consider a DM system designed to accommodate analog message signals limited to bandwidth $W = 5$ kHz. A sinusoidal test signal of amplitude $A = 1$ volt and frequency $f_m = 1$ kHz is applied to the system. The sampling rate of the system is 50 kHz.

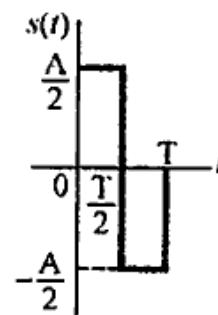
4+3

 - Calculate the step size Δ required to minimize slope overload.
 - Calculate the signal-to-(quantization) noise ratio of the system for the specified sinusoidal test signal.

- (b) Draw and explain block diagram of ADPCM system.
Compare PCM and ADPCM. 8

Unit III

5. (a) Explain Nyquist criteria for distortion less baseband binary transmission. 8
 (b) Consider the signal $s(t)$ shown in figure : 3+2+2
 (i) Determine the input response of a filter matched to this signal and sketch it as a function of time.
 (ii) Plot the matched filter output as a function of time. http://www.kuonline.in
 (iii) What is the peak value of the output ?



6. (a) Describe ideal Nyquist channel raised cosine spectrum in detail. 8
 (b) Explain the 'Least Mean Square' algorithm used for adaptive equalization. 7

Unit IV

7. (a) Discuss the performance of correlator to noise input in detail. 8
 (b) Discuss the Gram-Schmidt Orthogonalisation procedure in detail. 7
 8. (a) What is QPSK ? Draw the signal space diagram of coherent QPSK system and explain it. Also show that QPSK signal has the minimum average energy. 8
 (b) (i) Sketch the waveforms of the in-phase and quadrature components of the MSK signal in response to the input binary sequence 1100100010.
 (ii) Sketch the MSK waveform itself for the binary sequence specified in part (a). 4+3=7