Roll No. | | | | | | | | | | | | | Total No. of Pages : 01

Total No. of Questions : 08

M.Tech.(ECE) (2016 Batch) (Sem.–2)

INFORMATION THEORY & CODING

Subject Code : MTEC-203

Paper ID : [74280]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions in all.
2. Each question carries TWENTY marks.

1. What is a trellis code? Explain it with the help of trellis diagram. How it can be used in Viterbi decoding algorithm?
2. Explain pulse code modulation with the help of its block diagram.
3. Explain in brief :

   a) TDM b) Eye pattern equalization
4. Derive the relationship of impulse response of matched filter which will maximize the output signal-to-noise ratio.
5. Construct the mathematical relationship of output signal-to-quantization noise ratio of delta modulator to avoid slope-overload for sinusoidal signal $x(t) = a_0 \cos(2\pi f_0 t)$.
6. Evaluate the probability of error for coherent binary phase shift keying modulation technique under AWGN channel characteristics.
7. Construct the set of orthonormal functions for the signals given below using Gram-Schmidt orthogonalization process. Signals are

   $x_1(t) = U(t) - U(t - T/3)$, $x_2(t) = U(t) - U(t - 2T/3)$,

   $x_3(t) = U(t - T/3) - U(t - T)$, $x_4(t) = U(t) - U(t - T)$

   where, U(t) represent unit step function.
8. A discrete source transmits message x_1, x_2 and x_3 with the probabilities 0.3, 0.4 and 0.3, respectively. Source is connected to the channel as given in Figure-1. Calculate all the entropies for given conditional-probability matrix P(Y/X) as

$$P(Y/X) = \begin{bmatrix} 0.8 & 0.2 & 0 \\ 0 & 1 & 0 \\ 0 & 0.3 & 0.7 \end{bmatrix}$$