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Reg. No. : .....

Name : .....

First Semester M.Tech. Degree Examination, March 2013
(2008 Scheme)
(Electronics and Communication)
TTC 1003 : MODERN DIGITAL COMMUNICATION TECHNIQUES

Time : 3 Hours Max. Marks : 100

Instructions : *1) Answer* ***any five*** *questions.*
2) ***All*** *questions carry* ***equal*** *marks.*

1. A matched filter has the frequency response $H(f) = \frac{1 - e^{-j2\pi fT}}{j^2 \pi f}$.

   a) Determine the impulse response corresponding to H(f).

   b) Determine the signal waveform to which the filter characteristic is matched.

   c) State the properties of a matched filter.

2. a) Derive the probability of symbol error for PSK signal with M = 2, M = 4.

   b) Compare the SNR of M-ary QAM over M-ary PSK.

3. a) Obtain statistical model for fading channel.

   b) Compare the performance of digital modulation scheme such as BPSK, QPSK and FSK over wireless channel.

4. a) Determine the tap weight coefficients of a three-tap zero forcing equalizer if the ISI spans three symbols and is characterized by the values x(0) = 1, x (–1) = 0.3, x(1) = 0.2. Also determine the residual ISI at the output of the equalizer for the optimum tap coefficients.

   b) Explain the term ISI with respect to baseband PAM trio.

   c) Derive the Nyquist criterian for zeo ISI.

P.T.O.

5. a) Explain with block diagram a system for acquisition of direct sequence (DS) spread spectrum signal.

   b) A total of 30 equal-power users are to share a common communication channel by CDMA. Each user transmits information at a rate of 10 kbits/s via DS spread spectrum and binary PSK. Determine the minimum chip rate to obtain a bit error probability of 10^{-5}. Additive noise at the receiver may be ignored.

6. a) Explain the generation of PN sequence.

   b) With block diagram explain the generation of gold sequences of length n = 31. Obtain the cross-correlation peak.

   c) State and explain the application of DS-spread spectrum signals.