

MT/D11 : 8905
M.Tech 1.1 : Digital Communication Systems

Time : Three Hours

Maximum Marks : 60

Note:- Attempt any FIVE questions at least ONE question from each Unit.

UNIT-I

- Q.1. Consider a band pass signal $g(t)$ whose fourier transform is $G(F)$ and is centered at frequency $\pm f_c$ with triangular wave form. Represent it in canonical form and also show in-phase and quadrature components. 12
- Q.2 Represent a 16-ary PSK signal with its standard equation and also estimate its band width efficiency, also show the phase of each component. 12

UNIT - II

- Q.3 What is additive filtering. What is the bit error rate in case of (i) Coherent PSK (ii) coherent binary FSK (iii) Binary DPSK.

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Also give the difference between correlation and convolution. 12

- Q.4 a) Name the standard characteristics of a digital communication channel. Give two modes of synchronization. 6
- b) How can you recover the phase of a carrier, signal given is $e^{j\theta(n)}$ actual phase of signal is θ & estimated phase of the signal is $\hat{\theta}$, also find the phase error. 6

UNIT-III

- Q.5 a) In case of DPSK, given that $b_k = 10010011$ what is the resultant phase. If final bit is zero then phase is Ω and if final bit is 1 then phase is 0. 6
- b) What is orthogonality 6
 Explain gram smith process of orthogonality

- Q.6 What is matched filter. Find the signal to noise ratio of the matched filter where the Signal $S(t) = A, 0 < t < T$. And also find the impulse response of the filter for the same waveform. 12

UNIT - IV

- Q.7 Design a signal $S(t)$ at the digital modem's input such that each of its samples taken at the rate of $f_s = 8\text{KHz}$, matches one of the $M = 256$ threshold levels of the comparators, and the transmitted signals satisfy Nyquists' criterion for zero intersymbol interference. 12
- Q.8 What is equalization Explain the different techniques of equalization. Give the factors on which adaptive equalization performance depends. 12