Time: 3 hrs   M. Marks: 60

PART A

Q1 is compulsory to answer all the questions (02 marks of each) of Part A in short.

Q 1a.   What do you mean by Non-coherent Digital Modulation   (02)
          Technique ?

   b   What is Aliasing ?   (02)

   c   Define Line Coding.   (02)

   d   What do you mean by multiplexing?   (02)

   e   What is Nyquist Criterion of Zero ISI?   (02)

   f   What is the Drawback of binary PAM system?   (02)

   g   How quantization noise can be reduced in PCM?   (02)

   h   What do you mean by Granular noise?   (02)

   i   What do you mean by Aperature effect?   (02)

   j   What are the noise effect in PCM?.   (02)

PART B

Attempt any four questions from Part B in detail .

Q2a.   Determine the Nyquist Sampling Rate and Nyquist Sampling   (05)
         Interval for the following Signals:) (i) $\text{sinc}(100\pi t) + \text{sinc}(50\pi t)$

                                   (ii) $\text{sinc}^2(100\pi t)$

   b.   What do you mean by companding? Differentiate μ-law   (05)
         companding and A-law companding.

Q3a.   What do you mean by ISI explain it with block diagram ?What are   (05)
         its causes and remedies?

b. What do you mean by Nyquist's criterion for distortion less Base (05) band binary transmission? Explain it with detail.

Q4 a. Explain Gram –schmidt orthoganalization procedure in detail. (05)

b. Prove that for a matched filter, the maximum signal component (05) occurs at t=T and has magnitude equal to energy of the signal x(t).

Q5 a. Explain in detail the various source coding techniques for speech (05) signal and compare their performance

b. Obtain the probability of bit error for coherently detected BPSK (05) and compare its probability of bit error performance with QPSK scheme

Q6a. Given a sine wave of frequency f_m and amplitude A_m applied to a (05) delta modulator having step size Δ .Show that the slope overload distortion will occur if $A_m > \dfrac{\Delta}{2\pi f_m T_s}$

Where T_S is the sample period.

b What do you mean by optimum receiver?Evaluate the transfer (05) function of optimum filter.

Q7a 7bit PCM system employing uniform quntization has an overall (05) signaling rate of 56Kbits per second. Calculate the signal to quntization noise that would result when its input is a sine wave with peak amplitude equal to 5volt. Find the dynmic range for the sine wave inputs in order that the signal to quantization noise ratio may be less than 30dBs. What is the theortical maximum frequency that this system can handle?

b. Explain the quantization error and derive an expression for (05) maximum signal to noise ratio in PCM system that uses linear quantization.