Advanced Communication Systems
(1040)

P. Pages : 2

Time : Three Hours   Max. Marks : 100

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any five.** Each question carries equal marks.
5. Draw well label diagram and assume suitable data whenever necessary.

1. a) A received signal have amplitude of $\pm 2V$ held for a time T. The signal is corrupted by white Gaussian noise having power spectral density of 10^{-4} volts^2/Hz. If the signal is processed by integrate and dump receiver, what should be minimum time 'T' during which signal must be sustained so that the probability of error is not exceeding 10^{-4} ?

   b) Find the impulse response of the Match filter.

2. a) What is linear and non-linear modulation methods. Explain at least one in both categories.

   b) Draw and explain CPFSK and CPM signals.

3. a) Determine the LZ code and also decode the same to get the original string. 1011001001011101.

   b) Explain in detail scalar and vector quantization.

4. a) Design a BCH code with block length n=15 and error correcting capability tc=1, 2,3.
      Find all primitive polynomials.

   b) Consider the (31, 15) RS code.

      i) How many bits are there in a symbol of the code ?

      ii)   What is the block length in bits ?

      iii)   What is the minimum distance of the code ?

      iv)   How many symbols in errors can be correct ?

5. a) Explain in detail.

      i)   Nyquist Criteria.

      ii)   ISI.

   b) What is zero forcing algorithm, explain its significance.

6. a) What are peak distortion criteria and mean square error criteria ?

   b) What is ISI ? Explain ISI reduction techniques.

7. a) Define Spread Spectrum Modulation. Give the classification of Spread Spectrum, Draw and explain basic spread spectrum digital communication system.

   b) What is PN sequence ? How to generate it explain with example. Also explain its properties.

8. a) Explain

      i)   Processing Gain.

      ii)   FH-SS.

      iii) Slow Frequency Hopping.

      iv) Jamming Margin.

      v)   Application of Spread Spectrum.

   b) The direct sequence spread spectrum communication system has following parameters.
Data sequence bit duration, T_b=4.095 ms, PN Chip duration, T_c=1 µs.

Eb/No=10 for average probability of error less than 10^{-5}.
Calculate processing gain and jamming margin.

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