

Answer any **FIVE** Questions

All Questions carry **equal** marks

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1. (a) Differentiate between ideal sampling and practical sampling.
(b) Derive the transfer function of a gate function required to recover the sampled signal.

2. (a) Discuss different types of noise effects in delta modulation.
(b) Determine the processing gain of a DPCM system with a first order predictor, if the message signal has a normalized auto-correlation function of 0.8 for a lag of one period, assuming that the predictor is designed to minimize the mean -square value of the prediction error.

3. (a) Give the properties of matched filter.
(b) Explain different line codes with the help of waveforms.
(c) Distinguish between pass band and base band transmission.

4. (a) Explain the correlative coding and eye pattern.
(b) Data at a rate of 6 k bit/s is to be transmitted over a leased line of bandwidth 4 kHz by using Nyquist criterion pulses. Determine the maximum value of the roll-off factor r that can be used.
(c) For input binary data 1000101 obtain the output of duo-binary encoder and also the output of decoder.

5. (a) What are the properties of linear block codes? Give the mathematical description of linear block codes.
(b) Define syndrome and explain its properties.

6. (a) Write about joint entropy and conditional entropy. Obtain the relation between them.
(b) Consider a Binary Symmetric Channel (BSC). Find the channel capacity for,
(i) $P = 0.9$ and
(ii) $P = 0.6$.

7. (a) Compare digital modulation systems.
(b) Explain the theory of matched filter receiver.

8. Draw the structure of the receiver for an orthogonal wideband FSK signaling scheme and derive a relation for probability of error.