

1. Which technique is used to maximize signal-to-noise ratio (SNR) in communication systems?

- a) Matched filter
- b) Gram Schmidt orthogonalization
- c) Correlator detector
- d) Signal space concept

Answer: a) Matched filter

Explanation: A matched filter is designed to maximize the SNR by correlating the received signal with a known reference signal. It enhances the detection of the desired signal in the presence of noise.

2. What is the purpose of the Gram Schmidt orthogonalization procedure?

- a) To increase data rate in communication systems
- b) To minimize inter-symbol interference
- c) To generate orthogonal signals from a set of linearly independent signals
- d) To improve spectral efficiency

Answer: c) To generate orthogonal signals from a set of linearly independent signals

Explanation: Gram Schmidt orthogonalization is a mathematical procedure used to generate a set of orthogonal signals from a given set of linearly independent signals, which helps in efficient signal processing and modulation techniques.

3. Which method is utilized for detecting signals in the presence of noise by maximizing the correlation between received and reference signals?

- a) Matched filter
- b) Correlator detector

- c) Gram Schmidt orthogonalization
- d) Signal space concept

Answer: b) Correlator detector

Explanation: A correlator detector detects signals in noisy environments by maximizing the correlation between the received signal and a reference signal, making it effective for signal detection and demodulation.

4. What concept is employed for analyzing the probability of error in communication systems?
- a) Signal space concept
 - b) Matched filter principle
 - c) Gram Schmidt orthogonalization
 - d) Correlator detection technique

Answer: a) Signal space concept

Explanation: The signal space concept involves representing transmitted signals as points in a multi-dimensional space. By analyzing the geometry of this space, the probability of error can be computed for different modulation schemes.

5. Which modulation technique is typically associated with Binary Phase Shift Keying (BPSK)?
- a) Amplitude Shift Keying (ASK)
 - b) Frequency Shift Keying (FSK)
 - c) Phase Shift Keying (PSK)
 - d) Quadrature Amplitude Modulation (QAM)

Answer: c) Phase Shift Keying (PSK)

Explanation: BPSK modulates the phase of the carrier signal to represent binary data, making it a form of Phase Shift Keying modulation.

6. In which modulation scheme are both amplitude and phase of the carrier signal altered to represent multi-bit symbols?

- a) BPSK
- b) QPSK
- c) QAM
- d) BFSK

Answer: c) QAM (Quadrature Amplitude Modulation)

Explanation: QAM alters both the amplitude and phase of the carrier signal to represent multiple bits per symbol, enabling higher data rates compared to simpler modulation schemes like BPSK or QPSK.

7. What is the advantage of using QPSK over BPSK in terms of spectral efficiency?

- a) QPSK provides higher data rates
- b) QPSK requires less bandwidth
- c) QPSK is more robust to noise
- d) QPSK allows for simpler demodulation

Answer: b) QPSK requires less bandwidth

Explanation: QPSK achieves higher spectral efficiency compared to BPSK by encoding two bits per symbol while occupying the same bandwidth, making it suitable for applications where bandwidth efficiency is crucial.

8. Which modulation technique is particularly suited for communication over band-limited

channels?

- a) BPSK
- b) QPSK
- c) QAM
- d) Coherent BFSK

Answer: d) Coherent BFSK (Binary Frequency Shift Keying)

Explanation: Coherent BFSK is well-suited for band-limited channels because it uses frequency modulation to transmit binary data, which helps in conserving bandwidth and mitigating the effects of channel distortion.

9. What parameter is primarily considered when comparing different modulation techniques?

- a) Bandwidth efficiency
- b) Data rate
- c) Robustness to noise
- d) Power efficiency

Answer: a) Bandwidth efficiency

Explanation: Bandwidth efficiency is a key factor in comparing modulation techniques as it determines how efficiently data can be transmitted over a given bandwidth, influencing factors like spectral efficiency and data rate.

10. Which modulation scheme is most susceptible to phase ambiguity, especially in high-noise environments?

- a) BPSK
- b) QPSK
- c) QAM

d) Coherent BFSK

Answer: b) QPSK (Quadrature Phase Shift Keying)

Explanation: QPSK is susceptible to phase ambiguity because it relies on phase differences between symbols, which can be challenging to distinguish accurately in high-noise environments, leading to increased error rates.

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