

1. What does the Nyquist sampling theorem state?

- a) It defines the maximum data rate achievable in a digital communication system.
- b) It specifies the minimum sampling rate required to accurately reconstruct a signal.
- c) It determines the maximum frequency deviation in frequency modulation.
- d) It describes the maximum amplitude of a signal in pulse amplitude modulation.

Answer: b) It specifies the minimum sampling rate required to accurately reconstruct a signal.

Explanation: The Nyquist sampling theorem states that in order to accurately reconstruct a continuous signal from its samples, the sampling rate must be at least twice the highest frequency component of the signal.

2. Which technique is used to multiplex multiple signals into a single channel based on time slots?

- a) Frequency Division Multiplexing (FDM)
- b) Amplitude Modulation (AM)
- c) Time Division Multiplexing (TDM)
- d) Phase Modulation (PM)

Answer: c) Time Division Multiplexing (TDM)

Explanation: Time Division Multiplexing (TDM) is a technique used to multiplex multiple signals into a single channel by allocating each signal a separate time slot.

3. What does PCM stand for in digital communication?

- a) Pulse Code Modulation
- b) Phase Change Modulation
- c) Phase Code Multiplexing

d) Pulse Change Modulation

Answer: a) Pulse Code Modulation

Explanation: PCM stands for Pulse Code Modulation, which is a method used to digitally represent analog signals by sampling the amplitude of the signal at regular intervals and quantizing each sample into a digital code.

4. What is quantization error in PCM?

- a) The error introduced during modulation
- b) The error introduced during demodulation
- c) The error introduced during sampling and quantization
- d) The error introduced during transmission

Answer: c) The error introduced during sampling and quantization

Explanation: Quantization error refers to the difference between the actual analog signal and the quantized digital representation of that signal, which occurs during the sampling and quantization process in PCM.

5. Which modulation scheme is used for Binary Phase Shift Keying?

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

Answer: a) BPSK

Explanation: BPSK stands for Binary Phase Shift Keying, a digital modulation scheme where the phase of the carrier signal is shifted to represent binary data.

6. What is the main difference between BPSK and BFSK modulation schemes?

- a) BPSK uses frequency modulation, while BFSK uses phase modulation.
- b) BPSK uses phase modulation, while BFSK uses frequency modulation.
- c) BPSK uses amplitude modulation, while BFSK uses frequency modulation.
- d) BPSK uses frequency modulation, while BFSK uses amplitude modulation.

Answer: b) BPSK uses phase modulation, while BFSK uses frequency modulation.

Explanation: In BPSK, binary data is represented by shifting the phase of the carrier signal, while in BFSK, binary data is represented by shifting the frequency of the carrier signal.

7. What is Shannon's theorem for channel capacity?

- a) It determines the maximum data rate achievable in a noisy channel.
- b) It specifies the minimum bandwidth required for digital communication.
- c) It describes the maximum frequency deviation in frequency modulation.
- d) It determines the maximum amplitude of a signal in pulse amplitude modulation.

Answer: a) It determines the maximum data rate achievable in a noisy channel.

Explanation: Shannon's theorem for channel capacity states the maximum rate at which information can be transmitted over a noisy channel with a given bandwidth and signal-to-noise ratio.

8. Which modulation scheme is commonly used for digital communication over noisy channels?

- a) QPSK
- b) BPSK
- c) AM
- d) FM

Answer: a) QPSK

Explanation: Quadrature Phase Shift Keying (QPSK) is commonly used for digital communication over noisy channels because it offers better noise performance compared to BPSK by encoding two bits per symbol.

9. In digital communication, what is the significance of the sampling theorem?

- a) It determines the maximum data rate achievable.
- b) It specifies the minimum sampling rate required to accurately reconstruct a signal.
- c) It describes the maximum frequency deviation in frequency modulation.
- d) It determines the maximum amplitude of a signal in pulse amplitude modulation.

Answer: b) It specifies the minimum sampling rate required to accurately reconstruct a signal.

Explanation: The sampling theorem specifies the minimum sampling rate required to accurately reconstruct a continuous signal from its samples, ensuring faithful representation in digital form.

10. What does BFSK stand for?

- a) Binary Frequency Shift Keying
- b) Binary Phase Shift Keying
- c) Binary Amplitude Shift Keying
- d) Binary Pulse Shift Keying

Answer: a) Binary Frequency Shift Keying

Explanation: BFSK stands for Binary Frequency Shift Keying, a digital modulation scheme where binary data is represented by shifting the frequency of the carrier signal.

11. In Pulse Code Modulation (PCM), quantization error can be reduced by:

- a) Increasing the sampling rate
- b) Decreasing the number of quantization levels
- c) Increasing the amplitude of the analog signal
- d) Decreasing the duration of the sampling interval

Answer: b) Decreasing the number of quantization levels

Explanation: Quantization error in PCM can be reduced by decreasing the number of quantization levels, which increases the precision of the digital representation but may require more bits per sample.

12. Time Division Multiplexing (TDM) allocates time slots to different signals based on:

- a) Their frequency
- b) Their amplitude
- c) Their phase
- d) Their time

Answer: d) Their time

Explanation: TDM allocates time slots to different signals based on their time, allowing multiple signals to share the same channel without interfering with each other.

13. Which modulation scheme is immune to amplitude variations but susceptible to phase noise?

- a) Frequency Shift Keying (FSK)
- b) Amplitude Modulation (AM)
- c) Phase Shift Keying (PSK)
- d) Quadrature Amplitude Modulation (QAM)

Answer: c) Phase Shift Keying (PSK)

Explanation: PSK modulation is immune to amplitude variations because it encodes data based on phase changes. However, it is susceptible to phase noise, which can degrade the signal quality.

14. What is the primary advantage of Time Division Multiplexing (TDM)?

- a) Increased spectral efficiency
- b) Simplicity of implementation
- c) Resistance to noise
- d) Greater bandwidth utilization

Answer: d) Greater bandwidth utilization

Explanation: TDM allows multiple signals to share the same channel by allocating time slots, thereby increasing bandwidth utilization and enabling efficient use of the channel.

15. Which theorem establishes the theoretical limit on the maximum rate at which information can be reliably transmitted over a communication channel?

- a) Shannon's theorem
- b) Nyquist theorem
- c) Fourier theorem
- d) Euler's theorem

Answer: a) Shannon's theorem

Explanation: Shannon's theorem establishes the theoretical limit on the maximum rate of reliable information transmission over a communication channel, considering factors such as bandwidth and noise.

16. What is the purpose of quantization in Pulse Code Modulation (PCM)?

- a) To sample the analog signal
- b) To encode the digital signal
- c) To reduce the bandwidth
- d) To represent the analog signal with discrete levels

Answer: d) To represent the analog signal with discrete levels

Explanation: Quantization in PCM involves mapping the continuous amplitude of an analog signal to discrete levels, allowing it to be represented digitally.

17. Which modulation scheme is used to modulate digital signals onto an analog carrier wave by varying the frequency?

- a) Amplitude Shift Keying (ASK)
- b) Frequency Shift Keying (FSK)
- c) Phase Shift Keying (PSK)
- d) Quadrature Amplitude Modulation (QAM)

Answer: b) Frequency Shift Keying (FSK)

Explanation: FSK modulates digital signals onto an analog carrier wave by varying the frequency of the carrier signal to represent different binary states.

18. In Binary Phase Shift Keying (BPSK), how many phase shifts are used to represent each binary digit?

- a) One
- b) Two
- c) Three
- d) Four

Answer: a) One

Explanation: In BPSK, each binary digit is represented by a single phase shift of the carrier signal, typically 180 degrees.

19. Which modulation scheme is used in digital communication to encode multiple bits per symbol by varying both the amplitude and phase of the carrier signal?

- a) Amplitude Modulation (AM)
- b) Frequency Modulation (FM)
- c) Phase Shift Keying (PSK)
- d) Quadrature Amplitude Modulation (QAM)

Answer: d) Quadrature Amplitude Modulation (QAM)

Explanation: QAM encodes multiple bits per symbol by varying both the amplitude and phase of the carrier signal, allowing for higher data rates.

20. What is the fundamental principle behind Time Division Multiplexing (TDM)?

- a) Dividing the frequency spectrum into multiple bands
- b) Multiplexing multiple signals onto a single carrier wave
- c) Allocating time slots for each signal to share a common channel
- d) Phase modulation of the carrier wave

Answer: c) Allocating time slots for each signal to share a common channel

Explanation: TDM divides the transmission channel into time slots, allowing multiple signals to share the same channel by transmitting them sequentially during their respective time slots.



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