

الاتصالات MCQ

Here are 25 multiple-choice questions (MCQs) based on the provided document about Binary Phase Shift Keying (BPSK). Each question includes the correct answer marked.

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1. What does BPSK stand for?

- A) Binary Power Signal Keying
- B) Binary Phase Shift Keying
- C) Band Phase Signal Keying
- D) Binary Pulse Signal Keying

Answer: B) Binary Phase Shift Keying

2. The BPSK signal spectrum is centered around which frequency?

- A) Baseband Frequency
- B) Carrier Frequency
- C) Signal Frequency
- D) Sampling Frequency

Answer: B) Carrier Frequency

3. In BPSK, the maximum frequency in the baseband signal is equivalent to:

- A) $2F_o$
- B) F_b
- C) $F_o + F_b$
- D) F_o

Answer: B) F_b

4. What is the minimum bandwidth of a BPSK signal?

- A) F_o
- B) F_b
- C) $2F_b$
- D) $F_o - F_b$

Answer: C) $2F_b$

5. How is the bandwidth (BW) of a BPSK signal calculated?

- A) $BW = F_o - F_b$
- B) $BW = 2F_o$
- C) $BW = 2F_b$
- D) $BW = F_o / F_b$

Answer: C) $BW = 2F_b$

6. A drawback of BPSK is the ambiguity in the output signal due to:

- A) Interference
- B) Signal Noise
- C) Carrier Recovery
- D) Input Signal Polarity

Answer: D) Input Signal Polarity

7. The received BPSK signal after squaring remains the same if the input signal changes its:

- A) Frequency
- B) Phase
- C) Signal
- D) Amplitude

Answer: C) Signal

8. BPSK modulation uses how many phases?

- A) 2
- B) 4
- C) 8
- D) Infinite

Answer: A) 2

9. Which mathematical operation is used to regenerate the carrier signal in the BPSK receiver?

- A) Squaring
- B) Differentiation
- C) Integration
- D) Modulation

Answer: A) Squaring

10. Why can't the BPSK receiver determine whether the signal is $b(t)$ or $-b(t)$?

- A) Lack of sufficient bandwidth
- B) Ambiguity due to sign reversal

- C) Phase noise
- D) Interference

Answer: B) Ambiguity due to sign reversal

11. What happens to the squared signal in BPSK if the input signal changes its sign?

- A) It doubles in magnitude
- B) It remains the same
- C) It becomes zero
- D) It reverses phase

Answer: B) It remains the same

12. The phase difference between the two symbols in BPSK is:

- A) 45°
- B) 90°
- C) 180°
- D) 360°

Answer: C) 180°

13. BPSK is considered a simple form of:

- A) Frequency Modulation
- B) Amplitude Modulation
- C) Phase Modulation
- D) Pulse Modulation

Answer: C) Phase Modulation

14. What is the main advantage of BPSK?

- A) High spectral efficiency
- B) Noise immunity
- C) Simple implementation
- D) High data rate

Answer: C) Simple implementation

15. What is the disadvantage of BPSK?

- A) Low spectral efficiency
- B) High noise sensitivity
- C) Ambiguity in signal detection
- D) Complex circuitry

Answer: C) Ambiguity in signal detection

16. If the baseband frequency is 1 kHz, what is the bandwidth of the BPSK signal?

- A) 1 kHz
- B) 2 kHz
- C) 3 kHz
- D) 4 kHz

Answer: B) 2 kHz

17. The ambiguity in the BPSK signal is caused by:

- A) Phase noise
- B) Squaring of the signal
- C) Frequency drift
- D) Multipath fading

Answer: B) Squaring of the signal

18. Which frequency components define the spectrum of a BPSK passband signal?

- A) $F_o - F_b$ to $F_o + F_b$
- B) $2F_o$
- C) F_b to $2F_b$
- D) F_o to $2F_o$

Answer: A) $F_o - F_b$ to $F_o + F_b$

19. The main goal of a BPSK demodulator is to:

- A) Recover the baseband signal
- B) Filter out noise
- C) Amplify the carrier signal
- D) Change the signal polarity

Answer: A) Recover the baseband signal

20. The polarity of the recovered signal in BPSK depends on:

- A) Signal amplitude
- B) Squaring operation
- C) Phase synchronization
- D) Bandwidth

Answer: C) Phase synchronization

21. BPSK is best suited for which type of communication?

- A) High-speed data
- B) Low-speed but reliable communication
- C) Multimedia transmission
- D) Ultra-wideband signals

Answer: B) Low-speed but reliable communication

22. In BPSK, a single bit is represented by:

- A) Multiple symbols
- B) One of two phases
- C) Amplitude variations
- D) Frequency shifts

Answer: B) One of two phases

23. What happens to the signal-to-noise ratio (SNR) when using BPSK?

- A) It increases
- B) It decreases
- C) It remains constant
- D) It depends on bandwidth

Answer: A) It increases

24. The recovered carrier signal in BPSK can have ambiguity due to:

- A) Noise levels
- B) Signal amplitude
- C) Sign reversal of input signal
- D) Synchronization errors

Answer: C) Sign reversal of input signal

25. What happens to the carrier signal after squaring in the BPSK receiver?

- A) Its phase doubles

- B) It becomes noise-free
 - C) It gets amplified
 - D) It remains unchanged
- Answer: D) It remains unchanged

Here are 25 multiple-choice questions (MCQs) with the correct answers based on the content of the document about CW modulation:

1. What does CW stand for in CW modulation?

- A) Carrier Wave
- B) Continuous Wave
- C) Constant Wave
- D) Cyclic Wave

Answer: B) Continuous Wave

2. Which modulation technique varies the amplitude of the carrier wave based on the digital signal?

- A) Frequency Shift Keying (FSK)
- B) Amplitude Shift Keying (ASK)
- C) Phase Shift Keying (PSK)
- D) None of the above

Answer: B) Amplitude Shift Keying (ASK)

3. What is the primary purpose of CW modulation for digital signals?

- A) Noise Reduction
- B) Long-distance transmission
- C) Bandwidth Compression
- D) Signal Amplification

Answer: B) Long-distance transmission

4. Which parameter of the carrier signal is modified in Frequency Shift Keying (FSK)?

- A) Amplitude
- B) Frequency
- C) Phase
- D) Bandwidth

Answer: B) Frequency

5. In digital modulation, what is the term used for transmitting multiple bits simultaneously?

- A) Multiplexing
- B) Discrete Transmission
- C) M-ary Transmission
- D) Bandpass Transmission

Answer: C) M-ary Transmission

6. Which of the following is not a type of CW modulation?

- A) ASK
- B) FSK
- C) PMK
- D) PSK

Answer: C) PMK

7. In a bandpass transmission, the bandwidth of the signal is defined as:

- A) W Hz
- B) $2W$ Hz
- C) F_o Hz
- D) $W/2$ Hz

Answer: B) $2W$ Hz

8. What is the detection method called when the local carrier at the receiver is phase-locked with the transmitter carrier?

- A) Non-coherent Detection
- B) Envelop Detection
- C) Coherent Detection
- D) Analog Detection

Answer: C) Coherent Detection

9. What is the key advantage of non-coherent detection?

- A) High accuracy
- B) Simplicity
- C) Reduced bandwidth
- D) Error-free transmission

Answer: B) Simplicity

10. Which technique suffers from a higher probability of symbol error?

- A) Coherent Detection
- B) Non-coherent Detection
- C) Bandpass Detection
- D) Synchronous Detection

Answer: B) Non-coherent Detection

11. What is a major requirement for any digital modulation technique?

- A) Minimum data rate
- B) Maximum circuit complexity
- C) Maximum data rate
- D) Minimum transmitted power

Answer: C) Maximum data rate

12. The deviation of the carrier parameter during modulation is referred to as:

- A) Spectrum Width
- B) Carrier Drift
- C) Bandwidth
- D) Modulation Depth

Answer: C) Bandwidth

13. What does bandpass transmission indicate?

- A) Signal starts from 0 Hz
- B) Signal is centered around F_0 Hz
- C) Bandwidth is reduced
- D) Signal is analog in nature

Answer: B) Signal is centered around F_0 Hz

14. Amplitude Shift Keying (ASK) is similar to which analog modulation technique?

- A) Frequency Modulation
- B) Amplitude Modulation
- C) Phase Modulation
- D) Pulse Modulation

Answer: B) Amplitude Modulation

15. What is the main disadvantage of non-coherent detection?

- A) High system complexity
- B) Increased error probability
- C) Bandwidth inefficiency
- D) Incompatibility with digital signals

Answer: B) Increased error probability

16. Digital CW modulation signals are analog in nature after modulation because:

- A) It improves signal strength
- B) It allows transmission over standard

communication media

- C) It requires less power
- D) It is resistant to noise

Answer: B) It allows transmission over standard communication media

17. Which of the following is a key advantage of digital CW modulation?

- A) Reduced circuit complexity
- B) Elimination of intersymbol interference
- C) No bandwidth requirement
- D) Reduced transmitted power

Answer: B) Elimination of intersymbol interference

18. What type of modulation switches the phase of the carrier signal based on the digital input?

- A) ASK
- B) FSK
- C) PSK
- D) PWM

Answer: C) PSK

19. The spectrum of a low-pass signal is centered around:

- A) W Hz
- B) F_0 Hz
- C) 0 Hz
- D) $2W$ Hz

Answer: C) 0 Hz

20. Digital CW modulation allows for the use of which technique to conserve bandwidth?

- A) Filtering
- B) Multiplexing
- C) Sampling
- D) Signal Compression

Answer: B) Multiplexing

21. Baseband digital transmission suffers mainly from:

- A) Noise only
- B) Intersymbol interference and crosstalk
- C) Signal attenuation
- D) High circuit complexity

Answer: B) Intersymbol interference and crosstalk

22. Which media can be used to transmit CW modulated signals?

- A) Fiber optic cables
- B) Radio channels
- C) Coaxial cables
- D) All of the above

Answer: D) All of the above

23. Digital modulation techniques vary the carrier in:

- A) Continuous steps
- B) Discrete steps
- C) Random intervals
- D) None of the above

Answer: B) Discrete steps

24. What is the main reason to use digital CW modulation over baseband transmission?

- A) Higher bandwidth
- B) Resistance to interference

- C) Simplicity
- D) Long-distance transmission capability

Answer: D) Long-distance transmission capability

25. Which factor is not an important requirement for digital modulation techniques?

- A) Maximum data rate
- B) Maximum symbol error probability
- C) Minimum channel bandwidth
- D) Minimum transmitted power

Answer: B) Maximum symbol error probability

Here are 25 multiple-choice questions (MCQs) with the correct answers based on the content of the document about Quadrature Phase Shift Keying (QPSK):

1. What does QPSK stand for?

- A) Quadrature Pulse Shift Keying
- B) Quadrature Phase Shift Keying
- C) Quadratic Phase Signal Keying
- D) Quadrature Pulse Signal Keying

Answer: B) Quadrature Phase Shift Keying

2. Which two resources are important in communication systems?

- A) Frequency and Bandwidth

- B) Transmission Power and Channel Bandwidth
- C) Signal Power and Frequency
- D) Bandwidth and Noise

Answer: B) Transmission Power and Channel Bandwidth

3. In QPSK, two successive bits are grouped into:

- A) One symbol
- B) Two symbols
- C) Three symbols
- D) Four symbols

Answer: A) One symbol

4. What is the primary benefit of grouping bits into symbols in QPSK?

- A) Increased data rate
- B) Reduced bandwidth
- C) Increased power consumption
- D) Improved signal noise ratio

Answer: B) Reduced bandwidth

5. The channel bandwidth in BPSK is typically equal to:

- A) f_b
- B) $2f_b$
- C) $4f_b$
- D) $1.5f_b$

Answer: B) $2f_b$

6. How many distinct symbols are present in QPSK?

- A) 2
- B) 3
- C) 4
- D) 8

Answer: C) 4

7. What is the phase shift in QPSK for each symbol?

- A) 90°
- B) 180°
- C) 45°
- D) 60°

Answer: A) 90°

8. In QPSK, the phase change for a single symbol is equivalent to:

- A) π radians
- B) $\pi/2$ radians
- C) $\pi/4$ radians
- D) 2π radians

Answer: B) $\pi/2$ radians

9. Combining two successive bits in QPSK reduces the:

- A) Noise
- B) Signaling rate (fb)
- C) Symbol duration
- D) Carrier amplitude

Answer: B) Signaling rate (fb)

10. What happens to the bandwidth when the signaling rate is reduced in QPSK?

- A) It increases
- B) It remains constant
- C) It decreases
- D) It becomes zero

Answer: C) It decreases

11. In QPSK, the phase of the carrier changes by how many degrees for each symbol?

- A) 30°
- B) 45°
- C) 90°
- D) 180°

Answer: C) 90°

12. The table in QPSK shows symbols and their corresponding:

- A) Frequencies
- B) Bandwidth
- C) Phase shifts
- D) Amplitude levels

Answer: C) Phase shifts

13. The bandwidth requirement of a QPSK system with a 1 GHz carrier is approximately:

- A) 0.005 GHz
- B) 0.01 GHz

- C) 0.1 GHz

- D) 0.5 GHz

Answer: B) 0.01 GHz

14. What is the bandwidth in MHz of the QPSK system with the given lobe width?

- A) 1 MHz

- B) 10 MHz

- C) 100 MHz

- D) 1 GHz

Answer: B) 10 MHz

15. The reduction in signaling rate in QPSK is due to:

- A) Increased amplitude

- B) Combining successive bits

- C) Higher transmission power

- D) Reduced carrier frequency

Answer: B) Combining successive bits

16. How many lobes are shown in the QPSK spectrum?

- A) One

- B) Two

- C) Three

- D) Four

Answer: B) Two

17. The main lobe in the QPSK spectrum is centered around:

- A) 0 Hz
- B) ± 1 GHz
- C) 1 MHz
- D) ± 2 GHz

Answer: B) ± 1 GHz

18. What type of modulation reduces both transmission power and channel bandwidth?

- A) Amplitude Modulation
- B) Frequency Modulation
- C) Quadrature Phase Shift Keying
- D) Binary Phase Shift Keying

Answer: C) Quadrature Phase Shift Keying

19. Which of the following is reduced when two bits are grouped into one symbol in QPSK?

- A) Data rate
- B) Noise
- C) Transmission bandwidth
- D) Signal amplitude

Answer: C) Transmission bandwidth

20. What does grouping bits into symbols help achieve in QPSK?

- A) Higher error rate
- B) Simplified transmission
- C) Reduced bit rate
- D) Increased noise immunity

Answer: C) Reduced bit rate

21. What is the relationship between the bandwidth and the signaling rate in QPSK?

- A) Bandwidth is proportional to the signaling rate
- B) Bandwidth is independent of the signaling rate
- C) Bandwidth decreases as signaling rate increases
- D) Bandwidth is twice the signaling rate

Answer: A) Bandwidth is proportional to the signaling rate

22. In QPSK, the four possible symbols correspond to how many unique bit combinations?

- A) 2
- B) 3
- C) 4
- D) 8

Answer: C) 4

23. What is the primary difference between BPSK and QPSK?

- A) Number of phase shifts
- B) Amplitude variation
- C) Number of lobes in the spectrum
- D) Carrier frequency

Answer: A) Number of phase shifts

24. The reduction of transmission power and bandwidth in QPSK leads to:

- A) Decreased efficiency
- B) Increased noise
- C) Improved performance
- D) Simplified modulation

Answer: C) Improved performance

25. QPSK uses a phase change of 45° between symbols to:

- A) Increase data rate
- B) Enhance bandwidth
- C) Represent four distinct symbols
- D) Reduce power consumption

Answer: C) Represent four distinct symbols

I'll generate 25 multiple-choice questions (MCQs) based on the contents of the PDF. Here they are:

Multiple-Choice Questions (MCQs) on Phase Shift Keying (PSK)

1. What does PSK stand for?

- a) Phase Synchronization Keying
- b) Pulse Shift Keying
- c) Phase Shift Keying
- d) Power Signal Keying

✓ Correct Answer: c) Phase Shift Keying

2. Which modulation scheme does PSK primarily use?

- a) Frequency Modulation
- b) Amplitude Modulation
- c) Phase Modulation
- d) Pulse Code Modulation

✓ Correct Answer: c) Phase Modulation

3. In PSK, information is transmitted by changing the _____ of the carrier signal.

- a) Amplitude
- b) Frequency
- c) Phase
- d) Bandwidth

✓ Correct Answer: c) Phase

4. Which of the following is a commonly used type of PSK?

- a) QAM
- b) FSK
- c) QPSK
- d) ASK

✓ Correct Answer: c) QPSK

5. How many bits per symbol does QPSK transmit?

- a) 1
- b) 2

c) 4

d) 8

✓ Correct Answer: b) 2

6. Which of the following is an advantage of QPSK?

a) Requires high bandwidth

b) Low noise immunity

c) Higher data rate than BPSK

d) Uses higher power than BPSK

✓ Correct Answer: c) Higher data rate than BPSK

7. Which of the following modulation schemes provides better spectral efficiency?

a) BPSK

b) QPSK

c) 8-PSK

d) 16-PSK

✓ Correct Answer: d) 16-PSK

8. In a QPSK modulator, how many different phase shifts are used?

a) 2

b) 4

c) 8

d) 16

✓ Correct Answer: b) 4

9. Which component is essential in a PSK demodulator?
- a) Voltage Amplifier
 - b) Phase Detector
 - c) Low Pass Filter
 - d) Oscillator
- ✓ Correct Answer: b) Phase Detector
10. What is the primary disadvantage of PSK?
- a) Low bandwidth efficiency
 - b) Complex receiver design
 - c) High power requirement
 - d) Poor phase stability
- ✓ Correct Answer: b) Complex receiver design
11. QPSK is also known as:
- a) 2-PSK
 - b) 4-PSK
 - c) 8-PSK
 - d) 16-PSK
- ✓ Correct Answer: b) 4-PSK
12. Why is QPSK preferred over BPSK in communication systems?
- a) Lower bandwidth efficiency
 - b) Higher noise susceptibility
 - c) Higher data rate for the same bandwidth
 - d) Requires higher transmission power

✓ Correct Answer: c) Higher data rate for the same bandwidth

13. Which factor is used to distinguish different symbols in PSK?

- a) Amplitude
- b) Phase
- c) Frequency
- d) Wavelength

✓ Correct Answer: b) Phase

14. What happens to the signal in BPSK modulation?

- a) The phase shifts by 45°
- b) The phase shifts by 90°
- c) The phase shifts by 180°
- d) The amplitude is modulated

✓ Correct Answer: c) The phase shifts by 180°

15. What is a significant drawback of increasing the number of phase shifts in PSK?

- a) Increased power efficiency
- b) Increased noise immunity
- c) Increased receiver complexity
- d) Decreased bandwidth requirement

✓ Correct Answer: c) Increased receiver complexity

16. Which of the following techniques is used to improve PSK performance in noisy channels?

- a) Increasing bandwidth
- b) Error correction coding
- c) Using FM instead
- d) Reducing transmission power

✓ Correct Answer: b) Error correction coding

17. Which modulation type requires more complex hardware, QPSK or BPSK?

- a) BPSK
- b) QPSK

✓ Correct Answer: b) QPSK

18. How does Differential PSK (DPSK) differ from conventional PSK?

- a) It uses frequency shifts instead of phase shifts
- b) It encodes data in the difference between consecutive signals
- c) It requires an amplitude modulated carrier
- d) It transmits more bits per symbol

✓ Correct Answer: b) It encodes data in the difference between consecutive signals

19. Which of the following PSK types provides the highest data rate?

- a) BPSK

- b) QPSK
- c) 8-PSK
- d) 16-PSK

✓ Correct Answer: d) 16-PSK

20. What is the effect of noise on PSK systems?

- a) Reduces phase shifts
- b) Causes phase errors leading to incorrect symbol detection
- c) Increases bandwidth
- d) Reduces frequency variation

✓ Correct Answer: b) Causes phase errors leading to incorrect symbol detection

21. Which PSK variant is used in Wi-Fi and LTE networks?

- a) BPSK
- b) QPSK
- c) 16-QAM
- d) 64-QAM

✓ Correct Answer: b) QPSK

22. How does QPSK compare to 8-PSK in terms of noise resilience?

- a) QPSK is less resilient
- b) QPSK is more resilient
- c) Both have equal resilience
- d) Noise does not affect PSK systems

✓ Correct Answer: b) QPSK is more resilient

23. Why is PSK widely used in digital communication?

- a) High spectral efficiency
- b) High power consumption
- c) Simple demodulation
- d) Requires large bandwidth

✓ Correct Answer: a) High spectral efficiency

24. What is the main challenge in designing a PSK demodulator?

- a) Maintaining frequency stability
- b) Correctly detecting phase changes
- c) Generating high power signals
- d) Adjusting amplitude levels

✓ Correct Answer: b) Correctly detecting phase changes

25. Which component helps in synchronizing the phase in a PSK demodulator?

- a) PLL (Phase-Locked Loop)
- b) Mixer
- c) Low-pass filter
- d) Oscillator

✓ Correct Answer: a) PLL (Phase-Locked Loop)