

i will give you question and make it in pdf with answer higlighted MCQs with Answers

What is an example of a speech signal?

- a) A picture
- b) Music
- c) Phone conversation**
- d) Video clip

Answer: c) Phone conversation

What component converts sound to an electrical signal?

- a) Transmitter
- b) Receiver
- c) Input Transducer**
- d) Channel

Answer: c) Input Transducer

Which part of the communication system is responsible for sending the signal?

- a) Transducer
- b) Transmitter**
- c) Receiver
- d) Destination

Answer: b) Transmitter

True/False Questions with Answers

A video signal is a type of signal that transmits visual information.

Answer: True.

The receiver is responsible for converting a signal back to a human-readable form.

Answer: False. (The output transducer does this.)

Noise can interfere with a signal as it travels through the channel.

Answer: True.

The destination in a communication system is where the information originates.

Answer: False. (The source is where information originates.)

What is an example of an analog signal?

- a) A binary code
 - b) A sound wave**
 - c) A text message
 - d) A digital image
- Answer: b) A sound wave

Which signal uses 0s and 1s?

- a) Analog
- b) Digital**

Answer: b) Digital

What does DSP stand for?

- a) Digital Signal Process
- b) Data Signal Processing
- c) Digital Signal Processing**
- d) Direct Signal Processor

Answer: c) Digital Signal Processing

Which part of DSP converts analog to digital?

- a) **A/D**
- b) D/A
- c) Transmitter
- d) Channel

Answer: a) A/D

True/False Questions with Answers

Digital signals are continuous like analog signals.

Answer: False. (Digital signals have discrete steps.)

Digital Signal Processing involves converting signals so that computers can process them.

Answer: True.

Analog signals are better suited for computers than digital signals.

Answer: False. (Digital signals are better suited for computers.)

A/D conversion is used to convert digital signals back to analog.

Answer: False.

MCQs with Answers

Why is digital signal processing considered more flexible than analog?

- a) It requires hardware changes.
- b) **It can be reprogrammed without changing physical components.**
- c) It has fewer features.

Answer: b) It can be reprogrammed without changing physical components.

Which of these is a disadvantage of digital signals?

- a) They are easy to store.
- b) They are affected by temperature.
- c) **They require higher bandwidth.**

Answer: c) They require higher bandwidth.

What is a major advantage of digital signal storage?

- a) It's difficult to transport.
- b) **It's easy to store and transport.**
- c) It degrades over time.

Answer: b) It's easy to store and transport.

Which network type primarily uses digital transmission?

- a) Traditional radio
- b) **Internet**
- c) Analog TV

Answer: b) Internet

True/False Questions with Answers

Digital signals are harder to store and transport compared to analog signals.

Answer: False. (Digital signals are easier to store and transport.)

Digital systems provide better accuracy control than analog systems.

Answer: True.

One disadvantage of digital signals is the presence of quantization noise.

Answer: True.

Modern communication networks, like the internet, primarily use analog transmission.

Answer: False. (They use digital transmission.)

What is an example of a device that uses DSP?

a) Digital Camera

b) Analog TV

c) Typewriter

Answer: a) Digital Camera

What is the purpose of sampling in A/D conversion?

a) To assign values to each sample

b) To convert discrete signals to continuous signals

c) To break down a continuous signal into discrete intervals

Answer: c) To break down a continuous signal into discrete intervals

What is quantization in A/D conversion?

a) Converting a signal into time intervals

b) Assigning a fixed value to each sample

c) Mixing different signals

Answer: b) Assigning a fixed value to each sample

Which of these is NOT a common use for DSP?

a) Improving sound quality

b) Editing photos

c) Writing books

Answer: c) Writing books

True/False Questions with Answers

DSP is used in medical equipment like MRI machines to process signals.

Answer: True.

Quantization is the process of breaking a continuous signal into time intervals.

Answer: False. (That's Sampling; quantization assigns values to those intervals.)

Sampling in A/D conversion involves assigning each sample a specific value.

Answer: False. (Sampling is capturing at time intervals, quantization assigns the value.)

DSP can be found in everyday devices like smartphones and music players.

Answer: True. Here's a simplified explanation for these slides on Sampling Theorem and Aliasing.

MCQs with Answers

What is the minimum sampling rate to accurately capture a signal's details?

a) Half of the highest frequency

b) Twice the highest frequency

c) Same as the highest frequency

Answer: b) Twice the highest frequency

What happens when the sampling rate is below the Nyquist rate?

- a) The signal is clear and accurate
- b) The signal is distorted due to aliasing**

c) The signal has no effect

Answer: b) The signal is distorted due to aliasing

Aliasing occurs when:

- a) Sampling rate is too high
- b) Sampling rate is too low**

c) There is no signal present

Answer: b) Sampling rate is too low

True/False Questions with Answers

The Nyquist rate is the minimum sampling rate needed to avoid aliasing.

Answer: True.

Aliasing only happens when the sampling rate is more than twice the highest frequency.

Answer: False. (It occurs when the sampling rate is less than twice the highest frequency.)

Sampling at the Nyquist rate ensures accurate signal capture without distortion.

Answer: True.

Aliasing can cause different signals to appear similar, distorting the original data.

Answer: True.

Which of these is a way to represent a discrete signal?

- a) Graphical
- b) Functional
- c) Tabular
- d) All of the above**

Answer: d) All of the above

What is the value of the unit impulse signal at $n = 0$?

- a) 0
- b) 1**
- c) -1
- d) Depends on the function

Answer: b) 1

What is the purpose of the unit impulse signal in DSP?

- a) To test system responses**
- b) To display continuous signals
- c) To create noise

Answer: a) To test system responses

True/False Questions with Answers

In a discrete signal, the sequence representation lists values in order of time.

Answer: True.

The unit impulse is equal to 1 at all values of n .

Answer: False. (It's 1 only when $n = 0$.)

The tabular representation of a discrete signal displays it visually.

Answer: False. (The graphical representation displays it visually.)

The unit impulse is often used to analyze and understand system behavior.

Answer: True.

What is the value of the unit step signal $U(n)$ for $n < 0$?

- a) 1
- b) 0**
- c) -1
- d) Undefined

Answer: b) 0

Which formula shows the relationship between unit impulse and unit step?

- a) $\delta(n) = u(n) + u(n-1)$
 - b) $\delta(n) = u(n) - u(n-1)$**
 - c) $u(n) = \delta(n) + \delta(n-1)$
- Answer: b) $\delta(n) = u(n) - u(n-1)$

The unit step signal stays “on” at what value after $n \geq 0$?

- a) 0
- b) 1**
- c) -1
- d) Depends on the system

Answer: b) 1

True/False Questions with Answers

The unit step signal $U(n)$ is equal to 1 for all values of n .

Answer: False. (It's 1 only for $n \geq 0$.)

The unit impulse can be derived from the difference between two unit steps.

Answer: True.

The unit step signal can be built by summing multiple unit impulses.

Answer: True.

Unit impulse and unit step are unrelated signals in DSP.

Answer: False. (They are closely related and can be used to build each other.)

What is the value of the rectangular signal $x(n)$ outside its defined range?

- a) 1
- b) 0**
- c) Undefined

Answer: b) 0

What happens to the real value exponential signal $x(n) = a^n$ when $a > 1$?

- a) It grows as n increases**
 - b) It decays as n increases
 - c) It stays constant
- Answer: a) It grows as n increases

If $x(n) = 0$ for all $n < 0$ in a rectangular signal, it represents:

- a) A decaying exponential signal
- b) A finite active period**
- c) Continuous growth

Answer: b) A finite active period

True/False Questions with Answers

A rectangular signal is only active within a specific range and zero elsewhere.

Answer: True.

For a real value exponential signal with $a < 1$, the signal grows over time.

Answer: False. (It decays over time.)

A rectangular signal can be used to represent a limited period of activity.

Answer: True.

The exponential signal $x(n) = a^n$ will decay if $a > 1$.

Answer: False. (It grows if $a > 1$.)

Which formula represents the summation of a^k from 0 to infinity when $a < 1$?

a) $1 - a$

b) $a(1 - a)^2$

c) $a^{n+1} - a$

Answer: a) $1 - a$

What does a sinusoidal signal represent?

a) A periodic, oscillating signal

b) A constant signal

c) An exponential decay

Answer: a) A periodic, oscillating signal

In a sinusoidal signal $x(n) = \sin(\omega_0 n)$, the signal oscillates between which values?

a) 0 and 1

b) -1 and 1

c) $-\infty$ and $+\infty$

Answer: b) -1 and 1

True/False Questions with Answers

The formula $\sum_{k=0}^{\infty} a^k = \frac{1}{1-a}$ is valid only when $a < 1$.

Answer: True.

A sinusoidal signal is periodic and oscillates between -1 and 1.

Answer: True.

Sinusoidal signals are commonly used to model constant signals in DSP.

Answer: False. (They model oscillating or wave-like signals.)

The k-factor summation formula is used to find the sum of a constant signal.

Answer: False. (It's used for the sum of terms multiplied by k in exponential sequences.)

What operation does $y(n) = x_1(n) + x_2(n)$ represent?

a) Signal Addition

b) Signal Multiplication

c) Signal Division

Answer: a) Signal Addition

Signal addition is used when:

a) You want to amplify a signal

b) You want to combine two signals, like audio and background noise

c) You want to decrease the signal amplitude

Answer: b) You want to combine two signals, like audio and background noise

Signal multiplication $y(n)=x_1(n) \times x_2(n)$ is often used in:

a) Noise reduction

b) Modulation, such as in radio signals

c) Signal subtraction

Answer: b) Modulation, such as in radio signals

True/False Questions with Answers

Signal addition involves adding two signals sample by sample.

Answer: True.

In signal multiplication, each sample of the output signal is obtained by adding the corresponding samples of two input signals.

Answer: False. (Each sample is obtained by multiplying the corresponding samples.)

Signal multiplication can be used in applications like amplifying audio signals.

Answer: True.

Signal addition and signal multiplication are unrelated operations in DSP.

Answer: False. (They are both common operations used to process and combine signals in different ways.)

What does the scaling operation do to a signal?

a) Delays the signal

b) Multiplies each sample by a constant

c) Adds two signals together

Answer: b) Multiplies each sample by a constant

If $0 < a < 1$ in the scaling operation, the signal's amplitude will:

a) Increase

b) Decrease

c) Stay the same

Answer: b) Decrease

What does the operation $y(n)=x(n-1)$ represent?

a) Scaling

b) Addition

c) Shifting

Answer: c) Shifting

True/False Questions with Answers

In scaling, each sample of the signal is delayed by a constant value.

Answer: False. (Scaling multiplies each sample by a constant, it doesn't delay it.)

The operation $y(n)=a \times x(n)$ changes the amplitude of the signal.

Answer: True.

A one-unit delay in a signal can be represented by $y(n)=x(n-1)$.

Answer: True.

Shifting a signal affects its amplitude but not its timing.

Answer: False. (Shifting affects the timing, not the amplitude.)MCQs for Practice

If a signal $x(n)$ is multiplied by a scaling factor $a=-2$, what will happen?

- a) The signal will be amplified.
- b) The signal will be attenuated and inverted.
- c) The signal will be amplified and inverted.

Answer: c) The signal will be amplified and inverted.

What effect does scaling by a factor between 0 and 1 have on a signal?

- a) Amplification
- b) Attenuation
- c) Inversion

Answer: b) Attenuation

If a signal is scaled by a factor of 1, what is the result?

- a) The signal's amplitude doubles.
- b) The signal remains unchanged.
- c) The signal is inverted.

Answer: b) The signal remains unchanged.MCQs with Answers

Which operation calculates the total of all signal values within a range?

- a) Sample Product
- b) Sample Summation
- c) Time Shift

Answer: b) Sample Summation

If a signal is defined by $y(n)=x(-n)$, what operation is this?

- a) Time Shift
- b) Time Reversal
- c) Sample Product

Answer: b) Time Reversal

In a time shift operation, a right shift is represented by:

- a) $x(t+a)$
- b) $x(t-a)$
- c) $x(-t)$

Answer: b) $x(t-a)$

Sample Product involves:

- a) Adding samples within a range
- b) Multiplying samples within a range
- c) Shifting samples within a range

Answer: b) Multiplying samples within a range

True/False Questions with Answers

In time reversal, a signal is flipped around the point $n=0$.

Answer: True.

A left time shift can be represented as $y(t)=x(t-a)$.

Answer: False. (Left shift is $y(t)=x(t+a)$.)

Sample summation calculates the product of all values within a specified range.

Answer: False. (It calculates the sum, not the product.)

Time shift changes the signal's shape but not its position on the time axis.

Answer: False. (It changes the position, not the shape.)MCQs for Practice

If a signal is defined as $y(t)=x(t-3)$, this represents a:

- a) Left shift by 3 units
- b) Right shift by 3 units**
- c) No shift

Answer: b) Right shift by 3 units

What does a positive time shift ($x(t+t_0)$) do to a signal?

- a) Shifts it to the right
- b) Shifts it to the left**
- c) Inverts the signal

Answer: b) Shifts it to the left

In the shifted function $y(t)=x(t-1)$, what happens at $t=0$?

- a) $y(0)=x(-1)$**
- b) $y(0)=x(1)$
- c) $y(0)=x(0)$

Answer: a) $y(0)=x(-1)$

True/False Questions

A right shift of t_0 units moves the signal later in time.

Answer: True.

A left shift of t_0 units moves the signal to the right.

Answer: False. (A left shift moves the signal to the left.)

Time shifting a signal changes its amplitude.

Answer: False. (Time shifting changes the position, not the amplitude.)

The expression $x(t+t_0)$ represents a left shift of t_0 units.

Answer: True.MCQs for Practice

What does the operation $x(n-2)$ represent?

- a) A left shift by 2 units
- b) A right shift by 2 units**
- c) No shift

Answer: b) A right shift by 2 units

If a signal is shifted as $x(t+1)$, what happens to it?

- a) It shifts to the left by 1 unit**
- b) It shifts to the right by 1 unit
- c) It remains unchanged

Answer: a) It shifts to the left by 1 unit

Which of the following indicates an advance in a signal?

- a) $x(t-t_0)$
- b) $x(t+t_0)$**
- c) $x(-t)$

Answer: b) $x(t+t_0)$

True/False Questions

A left shift in time always makes the signal occur later.

Answer: False. (A left shift makes the signal occur earlier.)

The operation $x(n-3)x(n-3)$ shifts the signal to the right by 3 units.

Answer: True.

Time shifting changes the signal's amplitude and shape.

Answer: False. (Time shifting changes the timing but not the amplitude or shape.)

The function $u(t-1)u(t-1)$ represents a delayed version of the unit step function by 1 unit.

Answer: True. MCQs for Practice

If a signal is scaled with $\alpha=0.5$, what happens?

a) The signal is compressed.

b) The signal is stretched.

c) The signal is inverted.

Answer: b) The signal is stretched.

Which operation mirrors the signal around $t=0$?

a) Time Scaling

b) Time Shift

c) Time Inversion

Answer: c) Time Inversion

For the signal $y(t)=x(2t)$, the signal appears:

a) Twice as slow

b) Twice as fast

c) Unchanged

Answer: b) Twice as fast

True/False Questions

Time inversion changes the shape and amplitude of the signal.

Answer: False. (It only changes the direction in time.)

If $\alpha < 1$ in time scaling, the signal appears slower.

Answer: True.

Time scaling with $\alpha=1$ leaves the signal unchanged.

Answer: True.

When applying time shift and scaling to a signal, which operation should be applied first?

a) Time Scaling

b) Time Shift

c) Either can be applied first

Answer: b) Time Shift

If a continuous-time signal is shifted by $+3$ and then scaled by a factor of 2, the final expression is:

a) $x(2t+3)$

b) $x(2t-3)$

c) $x(2t+6)$

Answer: c) $x(2t+6)$

For a discrete-time signal $x[n]$, if you scale first and then shift, will the result be the same as shifting first and then scaling?

- a) Yes
- b) No

Answer: b) No

True/False Questions

For both continuous and discrete-time signals, time shift should be applied before time scaling.

Answer: True.

If you scale a signal before shifting, the result will be the same.

Answer: False. (Scaling before shifting can change the timing relative to the shift.)

Time shift only affects the signal's position, not its shape or amplitude.

Answer: True.

For a continuous-time signal $x(t)$, applying $x(t+3)$ followed by $x(2t)$ is the correct sequence for shifting by 3 and scaling by 2.

Answer: True.

Which of the following is an even signal?

- a) $\sin(t)\sin(t)$
- b) $\cos(t)\cos(t)$
- c) tt

Answer: b) $\cos(t)\cos(t)$

An odd signal is symmetric around:

- a) The y-axis
- b) The origin
- c) The x-axis

Answer: b) The origin

For a continuous-time signal $x(t)$, the even part is given by:

- a) $\frac{1}{2}(x(t)+x(-t))$
- b) $\frac{1}{2}(x(t)-x(-t))$
- c) $x(t)x(-t)$

Answer: a) $\frac{1}{2}(x(t)+x(-t))$

True/False Questions

A signal that is symmetric around the y-axis is an even signal.

Answer: True.

An odd signal is symmetric around the x-axis.

Answer: False. (It is symmetric around the origin.)

Any signal can be decomposed into an even part and an odd part.

Answer: True.

The formula for the odd part of a discrete-time signal $x[n]$ is $\text{Od}\{x[n]\} = \frac{1}{2}(x[n]-x[-n])$.

Answer: False. (It should be $\text{Od}\{x[n]\} = \frac{1}{2}(x[n]-x[-n])$.)