Started on	Wednesday, 16 February 2022, 8:15 AM
State	Finished
Completed on	Wednesday, 16 February 2022, 8:44 AM
Time taken	29 mins 27 secs
Marks	30.00/30.00
Grade	**20.00** out of 20.00 (**100**%)

Question 1

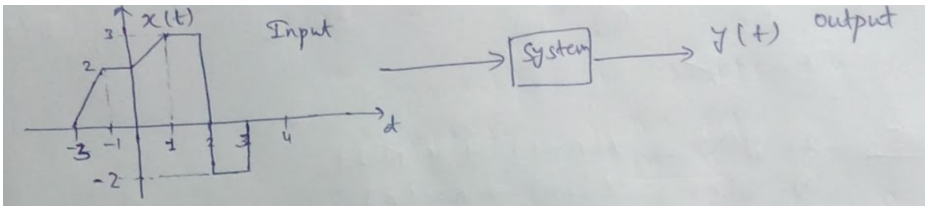
Correct

Mark 2.00 out of 2.00

Consider a signal x(t) as shown below. This signal is passed through a system which gives output $y(t)$. The system response is given by

$$y(t) = x\left(\frac{-t}{3} + 2\right).$$

Find the value of $y(12)$.



Answer: 1

Put value if t in argument of input signal and compute the time at which input signal value is needed.

The correct answer is: 1.00

Question 2

Correct

Mark 2.00 out of 2.00

A continuous time LTI system is described by:

$$\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = 2\frac{dx(t)}{dt} + 4x(t)$$

Assuming zero initial conditions, the response $y(t)$ of the above system for the input $x(t) = \exp(-2t)u(t)$ is given by:

Select one:

- a. $(e^{t} + e^{3t})u(t)$
- b. $(e^{-t} - e^{-3t})u(t)$ ✓
- c. $(e^{-t} + e^{-3t})u(t)$
- d. $(e^{t} - e^{3t})u(t)$
- e. Select this if you don't want to attempt

The correct answer is: $(e^{-t} - e^{-3t})u(t)$

Question 3

Correct

Mark 2.00 out of 2.00

Convolution of $x(t+4)$ with impulse function $\delta(t-8)$

is equal to

Select one:

- a. $x(t+4)$
- b. $x(t-4)$ ✓
- c. $x(t-12)$
- d. $x(t+12)$

Your answer is correct.

The correct answer is: $x(t-4)$

Question 4

Correct

Mark 2.00 out of 2.00

Let $y[n]$ denote the convolution of $h[n]$ and $g[n]$, where $h[n] = (\frac{1}{2})^n u[n]$ and $g[n]$ is a causal sequence. If $y[0] = 1$ and $y[1] = \frac{1}{2}$, then $g[1]$ equals

Select one:

- a. $\frac{1}{2}$
- b. $\frac{3}{2}$
- c. 1
- d. 0 ✓

The correct answer is: 0

Question 5

Correct

Mark 2.00 out of 2.00

The impulse response of a discrete time sytem is given by:

$h[n] = (-1)^n \frac{n}{2^n} u[n]$

For a bounded input with bound B_X the output bound will be:

Select one:

- a. $2B_X$ ✓
- b. $4B_X$
- c. The system is unstable.
- d. $8B_X$

The correct answer is: $2B_X$

Question 6

Correct

Mark 2.00 out of 2.00

Let ***x(t)*** and ***y(t)*** denote the input and output of a continuous time system. Which of the following descriptions corresponds to a casual system ?

Select one:

a. $y(t) = (t-4)x(t+1)$

b. $y(t) = (t+5)x(t-1)$ ✓

c. $y(t) = x(t-3) + x(t+2)$

d. $y(t) = (t+3)x(t+3)$

Your answer is correct.

The correct answer is: $y(t) = (t+5)x(t-1)$

Question 7

Correct

Mark 2.00 out of 2.00

Which of the following represents an invertible system?

Select one:

a. $y[n] = x[n]x[n-1]$

b. $y(t) = x^2(t)$

c. $y(t) = \sin(x(t))$

d. $y(t) = x(t-3)$ ✓

Your answer is correct.

The correct answer is: $y(t) = x(t-3)$

Question 8

Correct

Mark 2.00 out of 2.00

s(t) is the step response and h(t) is impulse response of a system. Its response y(t) for any input u(t) is given by

Select one:

a. $\frac{d}{dt}\int_0^t h(t-\tau)u(\tau)d\tau$

b. $\int_0^t \int_0^\tau s(t-\tau)u(\tau_1)d\tau_1 d\tau$

c. $\int_0^t s(t-\tau)u(\tau)\$d\tau$

d. $\frac{d}{dt}\int_0^t s(t-\tau)u(\tau)d\tau$

Your answer is correct.

The correct answer is: $\frac{d}{dt}\int_0^t s(t-\tau)u(\tau)d\tau$

Question 9

Correct

Mark 2.00 out of 2.00

if $y[n] = x[n](g[n] + g[n-1])$, for which of the following cases $y[n]$ s time invariant?

Select one or more:

- a. $g[n] = u[n]$
- b. $g[n] = n$
- c. $g[n] = (-1)^n$ ✓
- d. $g[n] = 1$ for all n ✓

$g[n] = 1 \Rightarrow y[n] = 2x[n] \Rightarrow$ Time Invariant

$g[n] = n \Rightarrow y[n] = (2n-1)x[n] \Rightarrow$ Non Time Invariant

$g[n] = (-1)^n \Rightarrow y[n] = x[n](1 + (-1)^n) + 1 + (-1)^{-n} = 2x[n] \Rightarrow$ Time Invariant

$g[n] = u[n] \Rightarrow y[n] = x[n](u[n] + u[n-1]) = \delta[n] + 2u[n-1] \Rightarrow$ Non Time Invariant

The correct answers are: $g[n] = 1$ for all n

, $g[n] = (-1)^n$

Question 10

Correct

Mark 2.00 out of 2.00

A system with input $x[n]$ and output $y[n]$ is given as

$$y[n] = (sin\frac{5}{6}\pi n)x[n]$$

The system is

Select one:

- a. Linear, stable and invertible
- b. non-linear, stable and non-invertible
- c. Linear, unstable and invertible
- d. Linear, stable and non-invertible ✓

Your answer is correct.

The correct answer is: Linear, stable and non-invertible

Question 11

Correct

Mark 2.00 out of 2.00

Consider the following statement about continuous time LTI systems:

1. The output signal in an LTI system with known input and known impulse response can be determined.

2. A causal LTI system is always stable.

3. A stable LTI system has an impulse response $h(t)$ which has a finite value when integrated over whole of time-axis, i.e. $\int_{-\infty}^{\infty} h(\lambda)d\lambda$ is finite.

Which of the statements given above are correct?

Select one or more:

- a. 1, 2 and 3
- b. 2 and 3
- c. 1 and 3 ✓
- d. 1 and 2

The correct answer is: 1 and 3

Question 12

Correct

Mark 2.00 out of 2.00

The odd component of the signal $x(t) = e^{(-2t)}cos(t)$ is

Select one:

- a. $-cosh(2t)cos(t)$
- b. $sinh(2t)cos(t)$
- c. $-sinh(2t)cos(t)$ ✓
- d. $cosh(2t)cos(t)$

Your answer is correct.

The correct answer is: $-sinh(2t)cos(t)$

Question 13

Correct

Mark 2.00 out of 2.00

Determine whether or not each of the following systems are invertible with input x[n] and y[n].

1. $y_1 = nx[n]$
2. $y_2 = (1 + (-1)^n)x[n]$

Select one:

- a. Both y_1 and y_2 are invertible
- b. Both y_1 and y_2 are non-invertible ✓
- c. y_1 is non-invertible and y_2 is invertible
- d. y_1 is invertible and y_2 is non-invertible

Your answer is correct.

The correct answer is: Both y_1 and y_2 are non-invertible

Question 14

Correct

Mark 2.00 out of 2.00

Consider the system with output response as $y[n] = \left(\frac{n+0.5}{n-0.5}\right)^2 x[n]$. Which of the following are true for this system?

Select one:

- a. Select this if you don't want to attempt
- b. Not stable but linear
- c. Neither stable nor linear
- d. Stable and linear ✓
- e. Stable but non-linear

Stability: $\left(\frac{n+0.5}{n-0.5}\right)^2$ has maximum value of 9 for n= 1. Hence, output is bounded for bounded input.

It is direct to prove that system is linear.

The correct answer is: Stable and linear

Question 15

Correct

Mark 2.00 out of 2.00

The value of the integral $\int_{-2}^{4} \sin(2t)\delta(2t - \frac{\pi}{2})dt$ is

Select one:

- a. $\sqrt{2}$
- b. 0
- c. $\frac{1}{2}$ ✓
- d. $\sqrt{3}$

Your answer is correct.

The correct answer is: $\frac{1}{2}$

◄ Quiz 4

Jump to...

Part B ►