Started on	Tuesday, 5 September 2023, 6:15 PM
State	Finished
Completed on	Tuesday, 5 September 2023, 7:00 PM
Time taken	44 mins 51 secs
Grade	**9.00** out of 15.00 (**60**%)

Question 1

Incorrect

Mark 0.00 out of 2.00

Let $h(t)$ be given by

$$h(t) = \begin{cases} \frac{t}{2} & 0 \leq t \leq 2 \\ 0 & Otherwise \end{cases}$$

Let $y(t) = h(t) * h(-t)$ (where $*$ denotes convolution).

$y(t)$ has a maximum value of 0.5 ✗

The maximum value of $y(t)$ occurs at $t =$ 2 ✗

Your answer is incorrect.

Question 2

Incorrect

Mark 0.00 out of 1.00

$u_1(t)$ is defined as $u_1(t) = \frac{d\delta(t)}{dt}$, and $f(t) = \exp(-2t)u(t)$. Then $\int_{-\infty}^{\infty} f(\tau)u_1(1-\tau)d\tau$ is

Select one:

- -2e^{-2}
- 1
- -e^{-2} ✗
- Incomplete question or none of the options is correct.
- 2e^{-2}

Your answer is incorrect.

The correct answer is: -2e^{-2}

Question 3

Correct

Mark 1.00 out of 1.00

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

Select one:

- Incomplete question or none of the options is correct.
- 3/2
- 1
- 1/2
- 0 ✓

Your answer is correct.

The correct answer is: 0

Question 4

Correct

Mark 1.00 out of 1.00

Let ω_0 denote an arbitrary frequency. Which one of the following is an eigen function of the class of all continuous-time, linear, (not necessarily real) time-invariant system ($u(t)$ denotes unit-step function)?

Select one:

- $\exp(j\omega_0 t)u(t)$ only
- More than one option is correct.
- $\exp(j\omega_0 t)$ only ✓
- $\cos(\omega_0 t)$ only
- $\sin(\omega_0 t)$ only

Your answer is correct.

The correct answer is: $\exp(j\omega_0 t)$ only

Question 5

Correct

Mark 1.00 out of 1.00

The result of the convolution

$x(-t) * \delta(-t - t_0)$

Select one:

a. $x(-t-t_0)$

b. \(x(t-t_0)\)

c. \(x(t+t_0)\)

d. \(x(-t+t_0)\)

e. Incomplete question or none of the options is correct.

Your answer is correct.

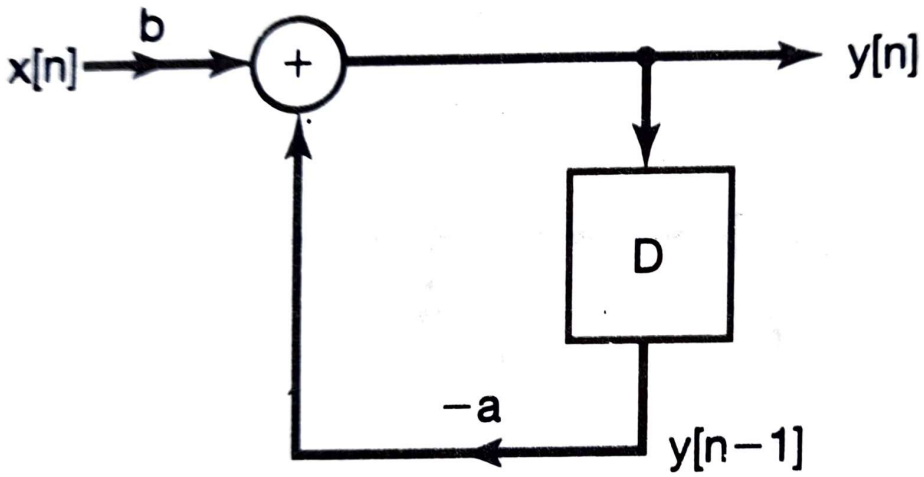
The correct answer is: \(x(-t-t_0)\)

Question 6

Correct

Mark 1.00 out of 1.00

In the figure shown below, \(b=1\), \(a=1\) and \(D\) denotes a delay element. Further, \(x[n]=u[n]\) and \(y[-1]=0\) The output \(y[n]\) at \(n=5\) is



Answer: 0

The correct answer is: 0

Question 7

Incorrect

Mark 0.00 out of 2.00

Consider the difference equation (with zero initial conditions) relating input $x[n]$ and output $y[n]$ of a system as follows: $y[n]-\frac{1}{2}y[n-1]=x[n]$. If $x[n]=\left(\dfrac{1}{2}\right)^n u[n]$, then the particular solution (part of the output due to the input $x[n]$ alone) at $n=3$ has a value (HINT: you must first find the homogenous component - the output due to zero input)

Answer: 0.5 ✗

The correct answer is: 0.375

Question 8

Correct

Mark 1.00 out of 1.00

Consider a discrete -time signal

$$x[n]=\begin{cases} n, & 0 \leq n \leq 10 \\ 0, & \text{otherwise} \end{cases}$$.

If $y[n]$ is the convolution of $x[n]$ with itself, the value of $y[4]$ is

Answer: 10 ✓

The correct answer is: 10

Question 9

Correct

Mark 1.00 out of 1.00

Let $h(t)=u(t)-u(t-6)$ be the impulse response of an LTI system. Let $q(t)=u(t)-2u(t-3)+u(t-6)$. If $x(t)=q(-t)$ is the input be the input to such a system, the output $y(t)$ at $t=6$ is

Answer: 0 ✓

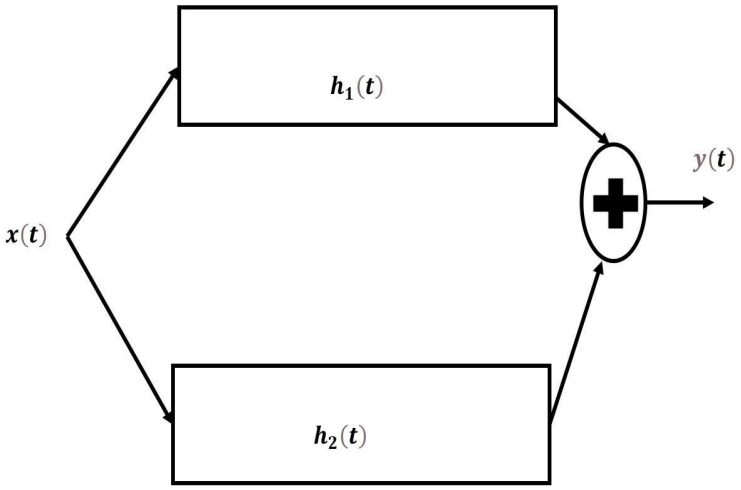
The correct answer is: 0

Question 10

Incorrect

Mark 0.00 out of 1.00

Consider the parallel combination of two LTI systems as shown in the figure. The impulse response of the systems are:



\(h_1(t)=2 \delta(t+2)-3\delta(t+1)\)

\(h_2(t)= \delta(t-2)\)

If the input \(x(t)\) is a unit-step signal, then the energy of \(y(t)\) is

Answer: 6 ✗

The correct answer is: 7

Question 11

Correct

Mark 1.00 out of 1.00

A linear time-invariant system with input \(x[n]\) and output \(y[n]\) and impulse response \(h[n]=\left(\dfrac{1}{5}\right)^nu[n]\) can not in reality be implemented because the convolution \(y[n]=\displaystyle\sum_{n=0}^{\infty}\left(\dfrac{1}{5}\right)^m u[m]x[n-m]\) since it requires infinite number of products and summations to generate one sample of the output \(y[n]\).

Select one:

- True
- False ✓

The correct answer is 'False'.

Question 12

Correct

Mark 1.00 out of 1.00

The impulse response $h(t)$ of a system is $h(t)=\dfrac{u(t)}{t+1}$. Is this LTI system stable? Yes/No No

Your answer is correct.

Question 13

Correct

Mark 1.00 out of 1.00

A continuous-time linear time-invariant system has an impulse response $h(t)$ described by $h(t)=u(t)-u(t-3)$, where $u(t)$ is the unit-step function. If the input $x(t)$ to the LTI system is $x(t)=5$, the output is

Answer: 15

The correct answer is: 15

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Quiz III ►