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ECE-320,
Quiz #5

For your ease, assume the form of convolution $y(n) = \sum_{k=-\infty}^{k=\infty} x(k)h(n-k)$ in all of the following problems.

1) The finite summation $S_N = \sum_{k=0}^{N} a^k$ is equal to

a) $\frac{1-a^N}{1-a}$ b) $\frac{1-a^{N-1}}{1-a}$ c) $\frac{1-a^{N+1}}{1-a}$ d) $\frac{1+a^{N+1}}{1-a}$ e) none of these

2) The finite summation $S = \sum_{k=-1}^{N+2} a^k$ is equal to

a) $a^{-1}\frac{1-a^{N+3}}{1-a}$ b) $a^{1}\left(\frac{1-a^{N+4}}{1-a}\right)$ c) $a^{-1}\left(\frac{1-a^{N+4}}{1-a}\right)$ d) $a^{-1}\left(\frac{1-a^{N-4}}{1-a}\right)$ e) none of these

3) For a discrete time system, $\delta(0)$ is equal to

a) 0 b) 1 c) ∞ d) it is not defined

4) If an LTI system with impulse response $h(n) = 4^{n-1}u(n-1)$ has input $x(n) = \delta(n)$, the output of the system is

a) $y(n) = 4^{n-1}u(n-1)\delta(n)$ b) $y(n) = 4^{n-1}u(n)$ c) $y(n) = 4^{n-1}u(n-1)$ d) none of these

5) If an LTI system with impulse response $h(n) = 3^{n+1}u(n)$ has input $x(n) = 3\delta(n-1)$, the output of the system is

a) $y(n) = 3^{n+1}u(n-1)$ b) $y(n) = 3^{n}u(n-1)$ c) $y(n) = 3^{n}u(n)$ d) none of these

6) If an LTI system with impulse response $h(n) = 2^{n-1}u(n-1)$ has input $x(n) = 2\delta(n-1)$, the output of the system is

a) $y(n) = 2^{n-1}u(n-2)$ b) $y(n) = 2^{n}u(n-2)$ c) $y(n) = 2^{n-1}u(n-2)$ d) none of these

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7) If an LTI system with impulse response $h(n) = 3\delta(n-1)$ has input $x(n) = 2\delta(n-1)$, the output of the system is

a) $y(n) = 3\times 2u(n-2)$ b) $y(n) = 3\times 2\delta(n-1)$ c) $y(n) = 3\times 2\delta(n-2)$ d) none of these

8) If an LTI system with impulse response $h(n) = 3^n u(n)$ has input $x(n) = u(n)$, the output of the system is

a) $y(n) = 3^n u(n)$ b) $y(n) = 3^{n+1} u(n)$ c) $y(n) = \frac{1-3^{n+1}}{1-3} u(n)$ d) $y(n) = \frac{1-3^{n-1}}{1-3} u(n)$ e) none of these

9) If an LTI system with impulse response $h(n) = 3^n u(n)$ has input $x(n) = 2^n u(n)$, the output of the system is

a) $y(n) = 3^n 2^n u(n)$ b) $y(n) = 3^n \frac{1-\left(\frac{2}{3}\right)^{n+1}}{1-\frac{2}{3}} u(n)$ c) $y(n) = 2^n \frac{1-\left(\frac{3}{2}\right)^{n+1}}{1-\frac{3}{2}} u(n)$

d) $y(n) = \left[\frac{1-\left(\frac{1}{2}\right)^{n+1}}{1-\frac{1}{2}}\right]\left[\frac{1-\left(\frac{1}{3}\right)^{n+1}}{1-\frac{1}{3}}\right] u(n)$ e) none of these

10) The sum $S = \sum_{k=0}^{\infty} a^k$ will converge provided

a) $|a| > 1$ b) $|a| < 1$

11) If the sum $S = \sum_{k=0}^{\infty} a^k$ converges, it is equal to

a) $\frac{1}{1+a}$ b) $\frac{1}{1-a}$ c) $\frac{a}{1-a}$ d) $\frac{a}{1+a}$ e) none of these