

**ECE-320,**  
**Practice Quiz #4**

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  $S = \sum_{k=2}^{N-3} a^k$  is equal to

- a)  $\frac{1-a^{N-4}}{1-a}$    b)  $a^2 \left( \frac{1-a^{N-4}}{1-a} \right)$    c)  $a^2 \left( \frac{1-a^{N+4}}{1-a} \right)$    d)  $a^2 \left( \frac{1-a^{N-1}}{1-a} \right)$    e) none of these

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

- a) 0   b) 1   c)  $\infty$    d) it is not defined

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

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

5) If an LTI system with impulse response  $h(n) = 3^n u(n)$  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  $h(n) = 2^n u(n-1)$  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

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

- a)  $y(n) = 3 \times 2^{n-1} u(n-2)$    b)  $y(n) = 3 \times 2^n u(n-1)$    c)  $y(n) = 3 \times 2^n u(n-2)$    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

Answers: 1-c, 2-b, 3-b, 4-c, 5-b, 6-b, 7-a, 8-c, 9-b, 10-b, 11-b