

## Quiz on Discrete-Time Convolution

*A companion to Joy of Convolution (Discrete Time). It is recommended that you use the applet to explore the question, and then see if you can mathematically justify your conclusion.*

1. If  $x[n]$  and  $h[n]$  both are odd signals, that is,  $x[-n] = -x[n]$  and  $h[-n] = -h[n]$ , then the output signal  $y[n]$  will be a
  - an even signal
  - an odd signal
  - such that  $y[0] = 0$
  - none of the above
2. If a discrete-time LTI system is such that the output signal is always identical to the input signal, then the unit-pulse response of the system is
  - a unit step
  - a unit pulse
  - all zeros
  - all ones
3. If an LTI system has a unit-pulse response with a finite number of nonzero values, and the input signal has a finite number of nonzero values, then the output signal
  - is all zeros
  - is constant
  - has a finite number of nonzero values
  - none of the above
4. If  $h[n]$  is a unit-step function and the input signal  $x[n]$  is a unit-ramp function, then the output signal value  $y[2]$  will be
  - 0
  - 1
  - 2
  - 3
  - none of the above
5. Suppose  $h[n]$  is all zero except for  $h[0] = h[1] = h[2] = 1/3$ . The best description for this LTI system is that it is
  - a low-pass filter
  - a high-pass filter
  - a bandpass filter
  - an all-pass filter