Jaypee University of Information Technology, Waknaghat

Mid Semester Examination

Summer Semester June 2018

Course Code: 10B11EC512

Time: 2 Hours

Course Name: Digital Signal Processing

Max. Marks: 50

Q1. Define LTI system with a suitable example. Also explain the properties of LTI system. [10]

Q2. Check whether the following systems are linear and time invariant [10]

(a) $y(n) = nx^2(n)$ (b) $y(n) = mx(n) + c$

Q3. Find out the convolution of the following signals: [10]

(a) $x(n) = \left(\frac{1}{2}\right)^n u(n)$, $h(n) = u(n)$

(b) $x(n) = \{\,1\,2\,5\,4\,3\,\}$, $h(n) = \{\,1\,2\,5\,4\,3\,\}$

Q4. Check the causality and stability of systems defined by the following impulse responses: [10]

(a) $h(n) = \left(-\frac{1}{2}\right)^n u(n) + (1.01)^n u(n-1)$

(b) $h(n) = 5^n u(3-n)$

Q5. Determine the zero state response of the system described by the following difference equation [10]

$y(n) - 0.6y(n-1) - 0.16y(n-2) = x(n)$ when the input is $x(n) = 4^{-n} u(n)$.