Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination
Aug 2017

Max. Marks: 30

Class: B.E.

Course Code: CPC 701

Name of the Course: Digital Signal Processing

Duration: 90 Min

Semester: VII

Branch: Computer

Instructions:
(1) Draw neat diagrams wherever required
(2) Assume suitable data if necessary and justify the same

Q No.		Max. Marks	CO
Q.1	A digital communication link carries binary-coded words representing samples of an input analog signal $x_a(t) = 3 \cos 2000\pi t + 5 \sin 6000\pi t + 10 \cos 12,000\pi t$ (a) What is the Nyquist rate for this signal $x_a(t)$? (b) Evaluate sampling, suppose the signal is sampled at the sampling rate $F_s = 5000$ samples/s.	5	CO1
Q.2	Let $x[n] = \{2, 3, \underset{\uparrow}{4}, 5, 6, 7\}$, Evaluate and sketch the following Discrete Time signals: $y[n] = x[n - 3]$, $f[n] = x[n + 2]$	5	CO1
Q.3	Perform linear convolution of the following two sequences: $x[n] = \{2, 5, 0, 4\}$ and $h[n] = \{4, 1, 3\}$ OR Perform linear convolution from circular convolution of the following two sequences: $x[n] = [2, 5, 0, 4]$ and $h[n] = [4, 1, 3]$	5	CO2
Q.4	Determine the DFT of the sequence $x(n) = (1, 2, 3, 4)$. Sketch the magnitude spectrum. OR Determine the IDFT of $X(K) = (10, -2+2j, -2, -2-2j)$	5	CO3
Q.5	Determine range of values of parameter 'a' for which the linear time invariant system with impulse response. $h(n) = a^n \quad n \geq 0 \quad and \quad n \quad even$ $\quad\quad = 0 \quad$ otherwise is stable	5	CO2

Q.6	Check whether the following system $y(n) = x(n) \cdot u(n)$ is: 1. Linear or non-linear 2. Casual or anti-casual. **OR** Check whether the following system $y(n) = y(n) = nx(n) + bx^2(n)$ is : 1. *Time Varient or invarient* 2. *Static or Dynamic*	5	CO2