LBB

R09

Code No: 09A60405

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year II Semester Examinations, May/June, 2013
Digital Signal Processing
(Electronics and Communications Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

- - -

1.a) Determine the impulse and unit step response of the systems described by the following difference equation
$y(n) = 0.6y(n-1)-0.08y(n-2)+x(n)$
b) Find 0s frequency response. [15]

2.a) State and prove circular convolution property of DFT.
b) Perform Linear convolution of the two sequences $x(n) = \{1,-1,2,-2,3,-3,4,-4\}$ and $h(n) = \{-1,1\}$ using over-lap add method. [6+9]

3.a) How the computational complexity is reduced in FFT over DFT?
b) Find the Four Point DFT of the sequence $x(n) = (-1)^n$, using DIF-FFT. [15]

4.a) Compare Direct form-I and Direct form – II Structures w.r.to hardware requirements.
b) Obtain the parallel and cascade realization structures for the system function given by $H(Z) = (1+¼Z^{-1}) / (1+½Z^{-1}) (1+½Z^{-1}+¼Z^{-2})$. [5+10]

5.a) What is Bilinear transformation and sketch the mapping of S-plane into Z-plane in bilinear transformation.
b) Explain how to convert an analog filter transfer function into digital filter transfer function using Bilinear transformation. [15]

6. Design an FIR Digital High pass filter using Hamming window whose cutoff freq is 1.2 rad/s and length of window N=5. Compare the same using Rectangular window. Draw the frequency response curve for both the cases. [15]

7.a) Discuss the sampling rate conversion by a factor I/D.
b) A sequence x(n) is upsampled by I =2, it passes through an LTI system $H_1(Z)$, an d then down sampled by D=2. Can we replace this process with a single LTI system $H_2(Z)$? If yes, determine the system function of this system. [15]

8.a) Discuss the effects due to finite word length in Direct form – I and II structures.
b) What is meant by over flow error and how it can be avoided? [15]

****