C.U.SHAH UNIVERSITY
Winter Examination-2019

Subject Name: Digital Signal Processing

Subject Code: 4TE05DSP1   **Branch: B.Tech (EC)**

Semester: 5   **Date: 27/11/2019**   **Time: 10:30 To 01:30**   **Marks: 70**

Instructions:
  (1) Use of Programmable calculator & any other electronic instrument is prohibited.
  (2) Instructions written on main answer book are strictly to be obeyed.
  (3) Draw neat diagrams and figures (if necessary) at right places.
  (4) Assume suitable data if needed.

Q-1	**Define the following terms:**	**(14)**
a)	Periodic Signal	
b)	Symmetric Signal	
c)	Energy Signal	
d)	Power Signal	
e)	Dynamic System	
f)	Time Invariant System	
g)	ROC	
h)	Zero Padding	
i)	Sectional Convolution	
j)	Overlap-add Method	
k)	Linear convolution	
l)	Bilinear Transformation	
m)	Input Quantization Error	
n)	Causal System	

Attempt any four questions from Q-2 to Q-8

Q-2	**Attempt all questions**	**(14)**
(a)	What are the basic elements of Digital Signal Processing of the system? State advantages of Digital over analog signal processing.	
(b)	Discuss the time domain behavior for a causal signals from the pole location in z domain.	
Q-3	**Attempt all questions**	**(14)**
(a)	Explain classification of discrete time systems in detail.	
(b)	Determine the z-transform of the signal: $x(n)=a^n(\cos\omega_o n)u(n)$	
Q-4	**Attempt all questions**	**(14)**
(a)	Determine the impulse response h(n) for the system described by the second-order difference equation **y(n)-3y(n-1)-4y(n-2)=x(n)+2x(n-1)**	
(b)	Explain symmetry properties of DFT.	
Q-5	**Attempt all questions**	**(14)**
(a)	Brief about architecture of DSP processor with necessary sketch.	

(b) Perform circular convolution for following two sequences
$x_1(n)= \{2,1,2,1\}$ and $x_2(n) = \{1,2,3,4\}$

Q-6 **Attempt all questions** (14)

(a) Determine the inverse z-transform of

$$X(z) = \frac{z^2}{z^2 - 1.5z + 0.5}$$, if x[n] is two-sided sequence.

(b) Explain design of FIR filters by Kaiser window and mention its advantages against the commonly used windows.

Q-7 **Attempt all questions** (14)

(a) Using decimation in time (DIT) radix-2 algorithm, compute 8 point DFT for the sequence

(b) Explain the design of IIR filter using Bilinear transformation method anddiscussits advantages over other design methods. Discuss the stabilityaspects andfrequency warping.

Q-8 **Attempt all questions** (14)

(a) Using decimation in frequency (DIF) radix-2 algorithm, compute 8 point DFT for the sequence

(b) What is BIBO stable system? Give derivation in support to the necessary condition for BIBO stable system.