III B. Tech II Semester Supplementary Examinations, November/December-2016
DIGITAL SIGNAL PROCESSING
(Electronics and Communication Engineering)

Time: 3 hours   Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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PART –A

1 a) What is BIBO stability? What are the conditions for BIBO stability?   [3M]
 b) Distinguish between linear and circular convolutions of two sequences.   [4M]
 c) Define canonic and non-canonic structures.   [4M]
 d) Explain Gibb's phenomenon.   [4M]
 e) Show that the interpolator is a time-variant system.   [3M]
 f) Write down the applications of each of the families of TIs DSPs.   [4M]

PART -B

2 a) Explain the method of obtaining the frequency response of linear shift-invariant systems.   [4M]
 b) For the following discrete time signals, determine whether or not the system is linear, shift invariant, causal and stable.   [8M]
    (i) $y(n)=x(n+7)$ (ii) $y(n)= x^3(n)$
 c) Determine the magnitude and phase response of the following system: [4M]
    $y(n)=[x(n) + x(n-1)]/2$.

3 a) State shifting property of the DFT.   [3M]
 b) Compute the FFT for the sequence $x(n)= n^2+1$ where N=8 using DIT algorithm.   [8M]
 c) What is DIT FFT algorithm?   [5M]

4 a) How will you develop a cascade structure with direct form II realization of a sixth order IIR transfer function?   [7M]

 b) Realize an FIR filter with impulse h response$=$ 1|2   is[[9M]

    given $-$by

    $\square - 5$]

5 a) Compare bilinear transformation and other transformations based on their stability.   [7M]
 b) The desired frequency response of a low-pass filter is   [9M]

$$= 0, \qquad \begin{matrix} - & 4 \leq \leq & 4 \\ 3 & /4 < || \leq \square \end{matrix} \#$$

    Determine   for M=7 using a rectangular window.

6 a) Discuss the computationally efficient implementation of interpolator in an FIR filter.   [8M]

 b) Draw and explain the polyphase structure of a decimator.   [8M]

7 a) List the family members of the first generation TMS processor and note down the distinguished features.   [7M]
 b) List the enhanced features of the TMS320C5X processor.   [9M]

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