Code No: RT32042 **R13** SET - 1

III B. Tech II Semester Supplementary Examinations, October/November - 2020

DIGITAL SIGNAL PROCESSING

(Electronics and Communication Engineering)

Time: 3 hours Max. 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 (22 Marks)

1 a) Check whether the following system is i) Linear, and ii)Time invariant. [4M]
$y(n+2)+2y(n)=x(n+1)+2$.
b) How FFT is more efficient to determine DFT of sequence? [3M]
c) What are the applications of Z-Transforms? [4M]
d) Explain about impulse invariant technique. [4M]
e) Draw the schematic of interpolator. [3M]
f) What are the different stages in pipelining? [4M]

PART –B (48 Marks)

2 a) Determine the frequency response, and time delay of the system given by. [8M]
$y(n)=x(n)-x(n-1)+x(n-2)$.
b) Determine whether the following system is: i) Linear ii) Causal iii) Stable, and iv) Time invariant. $y(n)=\log 10|x(n)|$ Justify your answer. [8M]

3 a) Find the DFT of the following sequence using DIF FFT? $x(n)=\{1,2,3,5,5,3,2,1\}$. [8M]
b) Find the inverse FFT of X[k] = [10, -2+j2, 4, -2-j2]. [8M]

4 a) Design an FIR Low Pass filter with $\omega_c = 1.4\pi/s$ *and* $N = 7$ using Hamming window. [8M]
b) Determine the Z-transform of the signals: [8M]
i) $x(n)=nu(n-1)$ ii) $x(n)=2^n\cos(3n)u(n)$.

5 a) What is a Kaiser window? In what way is it superior to other window functions? [8M]
b) Compare and Contrast Butterworth and Chebyshev approximations. [8M]

6 a) Give the time-domain characterization of up – sampler. [8M]
b) Explain about sampling rate conversion [8M]

7 a) Draw and explain the memory architecture of the TMS320C3X processor. [8M]
b) What is bit- reversed addressing mode? Explain. [8M]

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