

**Government College of Engineering Amravati**  
(An Autonomous Institute of Govt. of Maharashtra)  
**Electronics and Telecommunication Department**

Class Test: 1  
Subject: ETU604

Max. Marks: 15  
Date: 25/1/17

Solve any Three  
All Questions carry equal Marks

- 1] Compute the 8-pt DFT of sequence  $\{1, 2, 3, 4, 3, 2, 1, 0\}$  using DIT, FFT Algorithm. Show steps with suitable diagram.
- 2] Find circular convolution of following two sequences using FFT & IFFT.  
 $x_1[n] = \{1, 2, 3, 4\}$  &  $x_2[n] = \{5, 6, 7, 8\}$ .
- 3] Obtain the Direct Form I, Direct Form II, cascade & Parallel Structure for the following systems.  
 $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n) + \frac{1}{3}x(n-1)$ .
- 4] Find 4-pt DFT of the sequence  $x(n) = \cos n\pi/4$ .
- 5] Using scaling Property, determine the Z-transform of
  - i)  $a^n \cos \omega_0 n$
  - ii)  $a^n \sin \omega_0 n$

ETU-604 Digital Signal Processing  
CT1-SetB

Department of Electronics and Telecommunication

Marks-15  
Time-1Hr

A. Solve the following questions

- Q1) Find DFT of a sequence  $x(n)=\{1,2,3,4,4,3,2,1\}$  by using DIF FFT algorithm.
- Q2) Draw a block schematic of TMS320C2XX and explain internal bus architecture.
- Q3) Design a block diagram for TMS320C24XX processor and explain each block of architecture.
- Q4) Explain multirate narrowband digital filtering.
- Q5) Derive the equations of decimation in time FFT algorithm and design 8-point DIT structure?
- Q6) If  $X(K) = \{2, 1-j, 0, 1+j\}$ , find four point IDFT by matrix method.

7M OR  
7M  
4M OR  
4M  
4M OR  
4M

ETU-604 Digital Signal Processing  
CT1-SetB

Time-1Hr

Marks-15

Date:-3/01/15

A Solve the following questions.

- Q1) Explain Multirate Digital Signal Processing. And Consider ramp sequence and sketch its interpolated and decimated versions with a factor of '3'. 4M
- Q2) Draw Frequency spectrum of Interpolator & Decimator and Explain concept of Imaging and Aliasing. 4M
- Q3) Design a multirate LPF for the following specifications. 3M
- (i) Pass band 0 to 50Hz
  - (ii) Stop band 80 to 160Hz
  - (iii)  $\delta_p=0.01$ ,  $\delta_s=0.001$ ,  $F_s=600\text{Hz}$ .
- Q4) Find output  $y(n)$  for given input  $x(n) = a^n$  ;  $n > 0$  4M  
 $= 0$  ; otherwise, if sampling rate conversion factor is  $4/3$ . Draw all waveforms.
- OR

B Solve the following questions.

- Q1) Prove the following properties of Discrete time Fourier transform 3M
- a) Frequency Shifting property b) Linearity property 3) Magnitude and phase property
- Q2) If  $x(n) = \{---1, 1, 0, -1, 1, 0, ---\}$ ; find the Fourier Transform and sketch magnitude and phase spectrum 4M  
In the interval  $0$  to  $\pi$  4M
- Q3) Find 4-point DFT of  $x(n) = \{0, 1, 1, 0\}$  using matrix method. 4M
- Q4) Draw a block diagram of digital signal processing and explain each block. also discuss the applications of DSP. 4M

ETU604 DSP

**Department of Electronics and Telecommunication**  
Session I Class Test -I 15 MKs 29/01/2016

Solve any three.

1. Compare General Purpose processor with DSP processor. State the advantage of DSP processor.
2. Draw and explain architecture of TMS320C20. What are its key features?
3. Compare DSP processor of Analog Devices (ADI) with TMS(TI) DSP processor.
4. How is maximum through put is achieved by instruction set in TMS320C20. Enlist 15 Mnemonic along with its description of instruction set.
5. How digital filtering is achieved using TMS320C20. Write a simple program for FIR filter with updating coefficient.



**Government College of Engineering, Amravati**  
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**B. Tech. VI Semester.**

Summer 2020

Course Name: Digital Signal Processing

Course Code: ETU604

Time: 1 hr.00min.

Max. Marks: 15

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|----|---|-----|
| Q1 | <p><b>Solve ANY TWO from the following questions.</b></p> <p>A) If <math>x(n) = \{1, 1, 1\}</math>, <math>h(n) = \{1, 1, 1\}</math>, find convolution of two sequences using Fourier Transform and Inverse Fourier Transform. <span style="float: right;">8M</span></p> <p>B) Sketch magnitude and phase response of system <math>Y(n) = 1/2 [x(n) + x(n-1)]</math> by using Discrete Time Fourier transform. <span style="float: right;">CO1</span></p> <p>C) Find the circular convolution of <math>x_1(n) = \{1, -1, -2, 3, -1\}</math>, <math>x_2(n) = \{1, 2, 3\}</math> by<br/>i) Concentric circle method ii) Matrix method.</p>   |     |
| Q2 | <p><b>Solve the following questions.</b></p> <p>A) Find 8-point DFT for <math>x(n) = \{1, 1, 0, 0\}</math> using decimation in frequency FFT algorithm. Determine its all output stages. <span style="float: right;">7M</span></p> <p>B) If <math>x(n) = 1</math> for <math>n = -2, 0, 1</math>;<br/> <math>= 2</math> for <math>n = -1</math>;<br/> <math>= 0</math> elsewhere. <span style="float: right;">5M</span></p> <p><math>h(n) = \delta(n) - \delta(n-1) + \delta(n-2) - \delta(n-3)</math>. Find convolution by using linear method. <span style="float: right;">2M OR</span></p> <p>C] Using scaling Property, determine the Z-transform of<br/> i) <math>a^n \cos w_0 n</math> <span style="float: right;">2M</span><br/> ii) <math>a^n \sin w_0 n</math>.</p> | CO1 |