

Vidyavardhini's College of Engineering & Technology, Vadai(w)
Department of Electronics & Telecommunication Engineering

Curriculum Scheme: Rev2016

Examination: SE Semester: III

Course Code: ECC504 and Course Name: Electronic Discrete Time Signal Processing

Time: 2 Hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Radix - 2 FFT algorithm performs the computation of DFT in
Option A:	$N/2 \log_2 N$ multiplications and $2 \log_2 N$ additions
Option B:	$N/2 \log_2 N$ multiplications and $N \log_2 N$ additions
Option C:	$\log_2 N$ multiplications and $N/2 \log_2 N$ additions
Option D:	$N \log_2 N$ multiplications and $N/2 \log_2 N$ additions
2.	In which type of computation following butterfly diagram is used
Option A:	Linear Convolution using DFT and IDFT
Option B:	Decimation in Time FFT
Option C:	Circular Convolution using Time domain method
Option D:	Decimation in Frequency FFT
3.	The transformation technique in which there is many to one mapping from s-domain to z-domain is
Option A:	Bilinear transformation method
Option B:	Impulse Invariant Method
Option C:	Butterworth Method
Option D:	Sampling Method
4.	Which of the following substitution is done in Bilinear transformations?
Option A:	$s = \frac{2}{T} \left[\frac{1+Z^{-1}}{1-Z^{-1}} \right]$
Option B:	$s = \frac{2}{T} \left[\frac{Z^{-1}}{1+Z^{-1}} \right]$
Option C:	$s = \frac{2}{T} \left[\frac{1-Z^{-1}}{1+Z^{-1}} \right]$

Option D:	$s = \frac{2}{T} \left[\frac{1}{1+z^{-1}} \right]$
5.	Which of the following is not suitable either as low pass or a high pass filter?
Option A:	h(n) symmetric and M odd
Option B:	h(n) symmetric and M even
Option C:	h(n) anti-symmetric and M odd
Option D:	h(n) anti-symmetric and M even
6.	What is the approximate transition width of main lobe of a Hamming window?
Option A:	$4\pi/M$
Option B:	$8\pi/M$
Option C:	$12\pi/M$
Option D:	$2\pi/M$
7.	The quality of output signal from A/D converter is measured in terms of _____
Option A:	Quantization error
Option B:	Quantization to signal noise ratio
Option C:	Signal to quantization noise ratio
Option D:	Conversion constant
8.	Quantizing products leads to errors, popularly known as
Option A:	Aliasing
Option B:	Input errors
Option C:	Round-off errors
Option D:	Floating errors
9.	The length of the truncated filter should be
Option A:	M
Option B:	M-1
Option C:	Infinite
Option D:	M+1
10.	Which type of architecture uses different storage space for program code and the data?
Option A:	Von Neumann architecture
Option B:	Harvard architecture
Option C:	Fragmented architecture
Option D:	Split cell architecture
11.	In Overlap save method of long sequence filtering, what is the length of the input sequence block?
Option A:	L+M-1
Option B:	L+M
Option C:	L
Option D:	L-M-1
12.	FIR filter is -----.
Option A:	Stable
Option B:	Causal

Option C:	stable and causal
Option D:	stable and non causal
13.	Which of the following windows has a time domain sequence $h(n) = \frac{1}{2} \left(1 - \cos \frac{2\pi n}{M-1}\right)$?
Option A:	Bartlett window
Option B:	Blackman window
Option C:	Rectangular window
Option D:	Hanning window
14.	For the T.F (Z) $\frac{z}{z-0.9}$, Which of the following statement is correct?
Option A:	The system is maximum phase system
Option B:	The system is minimum phase system
Option C:	The system is all pass system
Option D:	The system is mixed phase system
15.	Which one is the common variable for EEG & ECG?
Option A:	Time
Option B:	Special coordinates
Option C:	Pressure
Option D:	Temperature
16.	If Transfer Function $H(Z) = \frac{(z+0.9)}{(z-0.9)(z-0.8)}$. Determine the stability of system based on location of pole zero.
Option A:	Stable
Option B:	Unstable
Option C:	Marginally Stable
Option D:	None of the above
17.	If Transfer Function $H(Z) = \frac{(z+0.9)}{(z-0.9)(z-0.8)}$. Determine the stability of system based on location of pole zero.
Option A:	Stable
Option B:	Unstable
Option C:	Marginally Stable
Option D:	None of the above
18.	If three co-efficients of $h_d(n)$ for length 5 are {0.005, 0.2, 0.25}, remaining coefficient of $h_d(n)$ for rectangular windows are of linear phase FIR filter are
Option A:	{0.05, 0.2, 0.25}
Option B:	{0.2, 0.005}
Option C:	{0.05, 0.2}
Option D:	{0.25,0.2, 0.005}
19.	Identify the function of MAC unit (frame multiple choice)
Option A:	Multiply and Add data in one cycle
Option B:	Multiply and Add data in multiple cycle

Option C:	Multiply, Shift data and add data in one cycle
Option D:	Multiply and Shift data in multiple cycle
20.	Determine value of analog frequency Ω_c when digital frequency $W_c = 0.2\pi$ rad and $T_s = 1$ sec using Bilinear Transformation.
Option A:	0.65 rad/sec
Option B:	1 rad/sec
Option C:	0.65 rad
Option D:	1 rad

Q2	Solve any Two Questions out of Three	10 marks each
A	<p>Design digital Butterworth Filter to satisfy the following conditions:</p> $0.707 \leq H(w) \leq 1 \quad 0 \leq W \leq 0.2 \pi$ $ H(w) \leq 0.1 \quad 0.5 \pi \leq W \leq \pi$ <p>Use Bilinear Transformation and assume $T_s = 1$ sec.</p>	
B	Design a linear phase FIR low Pass filter of length 7 and cut off frequency 10 1 rad/sec using Hamming Window	
C	<p>Find the DFT $X(K)$ of sampled data sequence $x(n) = \{1,2,3,4\}$ Determine DFT of $x1(n)$ and $x2(n)$ and $x3(n)$ using $X(K)$ only.</p> $x1(n) = \{4,1,2,3\}$ $x2(n) = \{2,3,4,1\}$ $x3(n) = \{6,4,6,4\}$	

Q3.		
A	Solve any Two	5 marks each
i.	Explain application of DSP processor to radar signal processing.	
ii.	Differentiate Fixed point and floating-point implementation.	
iii.	Compare IIR and FIR digital filters	
B	Solve any One	10 marks each
i.	Architecture of TMS320C67XX digital signal processor	
ii.	Effect of finite word length in digital filters	