SAMPLE PAPER

Examinations Commencing from 23rd December 2020 to 6th January 2021

Program: **Electronics Engineering**

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: ELX703 Course Name:Digital Signal Processing

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	One of the output values in the 4 point DFT of the sequence x(n)={5,6,7,8} is
Option A:	25
Option B:	29
Option C:	26
Option D:	30
2.	The energy of the sequence whose DFT is {6,-2+2j, -2, -2-2j} is
Option A:	14
Option B:	16
Option C:	18
Option D:	20
3.	Compute DFT of the sequence x(n)= [1,1,0,0]
Option A:	[2,1-j,1,1+j]
Option B:	[2,1-j,0,1+j]
Option C:	[2,1+j,0,1-j]
Option D:	[2,1+j,1,1-j]
4.	If N= 16, the total number of complex multiplications and additions required respectively for computing N point DFT by radix-2 FFT are
Option A:	80 and 64
Option B:	64 and 80
Option C:	32 and 64
Option D:	24 and 12
5.	Number of complex additions and complex multiplications in DFT are:

Option A:	N(N-1) and N^2
Option B:	N^2 and N
Option C:	N* log (N) and (N-1)
Option D:	N and N^2
6.	In the impulse invariant transformation RHS of S plane is mapped to
Option A:	Inside the unit circle in the Z plane
Option B:	Outside the unit circle in the Z plane
Option C:	On to the unit circle in the Z plane
Option D:	RHS of the Z plane
7.	In Butterworth and Chebyshev transfer function, when N is even, the nature of poles are _____
Option A:	Complex and exist as conjugate pairs
Option B:	Complex but not conjugate pairs
Option C:	One pole is complex and other poles are real
Option D:	One pole is real and other poles are complex and conjugate
8.	The roots of an Nth order Chebyshev polynomial Cn(x) occur in the interval
Option A:	0<=x<=1
Option B:	-1<=x<=0
Option C:	-1<=x<=1
Option D:	-0.5<=x<=0.5
9.	Find the digital transfer function H(z) by using impulse invariant method for the analog transfer function H(s)= 1/(s+2). Assume T=0.5 sec
Option A:	H(z)= 1/(1-e^(-1) z^(-1))
Option B:	H(z)= 1/(1-e^1 z^(-1))
Option C:	H(z)= 1/(1-e^(-1) z^1)
Option D:	H(z)= 1/(1-e^(-2) z^(-1))
10.	Linear FIR filter which is having even symmetry and even length is called____
Option A:	Type 1
Option B:	Type 2
Option C:	Type 3
Option D:	Type 4
11.	For a digital bandstop filter with lower stop band edge frequency 100 Hz and upper stop band edge frequency 200 Hz and sampling frequency 1 khz, what is the filter coefficient at n=0, ie h(0) is_____

Option A:	0.2
Option B:	0.8
Option C:	0.4
Option D:	0.6
12.	What is the width of the main lobe of the frequency response of a rectangular window of length M ?
Option A:	π/M
Option B:	2π/M
Option C:	4π/M
Option D:	8π/M
13.	If an FIR filter has constant phase delay as well as constant group delay and N is odd then it is of type_____
Option A:	Type I
Option B:	Type II
Option C:	Type III
Option D:	Type IV
14.	The dynamic range in bits in image processing applications is of the order of ___
Option A:	10 bits
Option B:	20 bits
Option C:	30 bits
Option D:	70 bits
15.	How is the sensitivity of filter coefficient quantization for FIR filters?
Option A:	High
Option B:	Low
Option C:	Moderate
Option D:	Unpredictable
16.	A 3 stage decimator is used to reduce the sampling rate from 3072 kHz to 48 kHz. What is the overall decimation factor?
Option A:	64
Option B:	32
Option C:	128
Option D:	256
17.	Consider the discrete time sequence: x(n) = {1, 2, 3, 4}. Converting the sampling rate by a factor (⅔) will result in:
Option A:	{1, 0, 2, 0, 3, 0, 4, 0}

Option B:	{1, 0, 4}
Option C:	{1, 3}
Option D:	{1, 0, 0, 2, 0, 0, 3, 0, 0, 4, 0, 0}
18.	How many clock cycles are required when the MACD instruction is to be executed in a machine with Von Neumann Architecture?
Option A:	1
Option B:	2
Option C:	3
Option D:	4
19.	Which processor is having 2 multipliers?
Option A:	TMS320C10
Option B:	TMS320C6200
Option C:	DSP56300
Option D:	TMS320C50
20.	Which of the following DSP processor family has VLIW architecture?
Option A:	TMS3201X
Option B:	TMS3203X
Option C:	TMS3205X
Option D:	TMS3206X

Q2 .	**Solve any TWO out of the given three questions. All the sub questions carry 10 marks each .Total marks for this question is 20 marks (20)**
A	Find the DFT using decimation in frequency FFT algorithm. x(n)={1,2,1,2,0,2,1,2}
B	Design a lowpass FIR filter with 11 coefficients for the following specifications . Passband edge frequency=0.25 kHz. Sampling frequency=1 kHz Use a)Hamming window. b)Hanning window
C	Given the transfer function $H(z)=H_1(z).H_2(z)$ Where $H_1(z)=1/(1-a_1z^{-1})$, $H_2(z)=1/(1-a_2 z^{-1})$. Find the output roundoff noise power .Assume $a_1=0.5$ and $a_2=0.6$ and find the output roundoff noise power

Q3 .	**Solve any TWO out of the given three questions. All the sub questions carry 10 marks each .Total marks for this question is 20 marks (20)**
A	A highpass digital filter meeting the following specifications is required. Passband 2-4 kHz, Stopband=0-500 Hz Passband ripple=3 db Stopband attenuation =20db .Sampling frequency=8 kHz. Assume butterworth characteristics and use bilinear transformation.
B	Explain the process of decimation by a factor D with block diagrams.Draw the spectral diagrams.
C	Draw the block diagram of a 3rd generation fixed point DSP processor and explain the features.