

University of Mumbai

Program: Electronics Engineering

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ELX703 and Course Name: Digital Signal Processing

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	In ECG signal the heart rate is computed using _____ interval
Option A:	R-R interval
Option B:	S-S interval
Option C:	T-T interval
Option D:	Q-Q interval
2.	The normalized transition width of a Rectangular window of length N is written as
Option A:	$\frac{3.1}{N}$
Option B:	$\frac{3.3}{N}$
Option C:	$\frac{5.5}{N}$
Option D:	$\frac{0.9}{N}$
3.	If an input signal $x[n]$ having a range 10V is passed through a 6-bit quantizer then the quantization step size
Option A:	0.15625
Option B:	0.015625
Option C:	0.00244
Option D:	0.0244
4.	The DIT FFT algorithm divides the sequence into
Option A:	Positive and negative values
Option B:	Even and Odd samples
Option C:	Upper higher and lower spectrum
Option D:	Small and large samples
5.	The architecture that employs instruction level parallelism is
Option A:	Von-Neumann architecture
Option B:	Harvard architecture
Option C:	Modified Harvard architecture
Option D:	VLIW architecture
6.	The normalized transfer function of lowpass filter is transformed to highpass filter with cutoff frequency, Ω_c by the transformation
Option A:	$S_n \rightarrow s^* \Omega_c$
Option B:	$S_n \rightarrow s / \Omega_c$

Option C:	$S_n \rightarrow \Omega c/s$
Option D:	$S_n \rightarrow s^{2^*} \Omega c$
7.	The sign magnitude and twos complement representation of the decimal number (-10) is given as ----- and -----respectively
Option A:	01010, 10101
Option B:	11010, 10110
Option C:	1010, 0110
Option D:	-1010, -0101
8.	If DFT $\{x(n)\} = X(k)$, then DFT $\{x(n+m)\}$ is
Option A:	$X(k) e^{-j2\pi km/N}$
Option B:	$X(k) e^{j2\pi km/N}$
Option C:	$X(k) e^{j2\pi k/mN}$
Option D:	$X(k) e^{-j2\pi k/mN}$
9.	The location of compulsory zero in a Type II linear phase FIR filter is at _____ and in Type IV is at _____
Option A:	$z = -1, z = +1$
Option B:	$z = +1, z = -1$
Option C:	$z = \pm 1$, No compulsory zeros
Option D:	No compulsory zeros, $z = \pm 1$
10.	If an N-point sequence, If N=16, the total number of complex additions and multiplications using Direct Computation of DFT are,
Option A:	240,256
Option B:	256,240
Option C:	256,256
Option D:	240,300

Q2. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	(i) Determine the DFT of the sequence $x(n)$ (ii) Also Find the DFT of the following sequences, using the result obtained in (i)	
B	Compare impulse In-variance method and BLT method.	
C	Short note on finite word length effect in digital filters. State advantages and disadvantages of digital filter.	

Q3. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Design linear phase FIR low pass filter of length T and cut of frequency 1 rad/sec using hamming window.	

B	Write down the design steps for FIR filter using the window techniques. Compare windows.
C	What is multirate DSP? Where it is required?

Q4. (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Explain the need of DSP processors. Write a detailed note on DSP Processor.	
B	Compare DSP processor and Microprocessor.	
C	Explain Architecture of TMS320C6XX DSP Processor	