University of Mumbai

Program: **B.E. Computer Engineering**
Curriculum Scheme: 2016
Examination: BE Semester VII
Course Code: CSC701 and Course Name: Digital Signal & Image Processing
Time: 2hour 30 minutes 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.	$\delta(n)$ =
Option A:	$u(n) + u(n-1)$
Option B:	$u(n)\ u(n-1)$
Option C:	u(n) – u(n – 1)
Option D:	$u(n-1) - u(n)$
2.	Find the cross correlation of two finite length sequences: $x(n) = \{2, 3, 1, 4\}$ and $y(n) = \{1, 3, 2, 1\}$
Option A:	{7,13,17,14,2,13,4}
Option B:	{2, 7, 13, 17, 14, 13, 4}
Option C:	{7,13,13,14,12,13,4}
Option D:	{7,12,17,14,3,2,5}
3.	The discrete time function defined as u(n)=n for n>=0;u(n)=0 for n<0 is an:
Option A:	Unit sample signal
Option B:	Unit step signal
Option C:	Unit ramp signal
Option D:	Unit Sequence signal
4.	What is the DFT of the four point sequence x(n)={1,2,3,4}?
Option A:	{10,-2+2j,-2,-2-2j}
Option B:	(10,-2,-2-2j,-2-2j}
Option C:	{-2,10,2+2j,2-2j}
Option D:	(10,10,10,2}
5.	For DIT FFT, the input is in _____ order and the output is in _____ order.
Option A:	bit reverse, normal
Option B:	normal,normal
Option C:	normal, bit reverse
Option D:	reverse, bit reverse
6.	In FFT there are _____ butterflies per stage of the computation process.

Option A:	N*N
Option B:	N
Option C:	2N
Option D:	N/2
7.	Median filter belongs to which category of filters?
Option A:	Linear spatial filter
Option B:	Frequency domain filter
Option C:	Order static filter
Option D:	Sharpening filter
8.	In a dark image, the components of histogram are concentrated on which side of the grey scale?
Option A:	High
Option B:	Medium
Option C:	Low
Option D:	Evenly distributed
9.	First order derivatives produce _____ edges.Second order derivatives much _____ ones.
Option A:	thick,finer
Option B:	thick,thick
Option C:	thin,fine
Option D:	fine,fine
10.	For signal x(n)=$\left(\frac{1}{2}\right)^n u(n)$ what is the energy?
Option A:	4/3
Option B:	3/4
Option C:	1/2
Option D:	1

Q2	**Solve any Two Questions out of Three 10 marks each**
A	Explain any 5 properties of Discrete Fourier Transform
B	For x(n) = {1,3,-1,2,0,4}*[Pointer at first value of the signal]*, plot the following discrete time signals (i) x (n+2) (ii) x(-n-1) (iii) 2x(n) (iv) x(n-1).δ (n-3) (v) x(n).u(n-2)
C	Compute linear convolution of the causal sequences x[n] = {1, 2, 3, -1, 2, -2, 0, -1} and h[n]={-1, 2, 1} using overlap save method.

Q3	
A	**Solve any Two each** **5 marks**
i.	Explain Energy and Power signal with example.
ii.	Compute 4-point DFT of the sequence given by $x(n)= (-1)^n$
iii.	State whether the system y(n)=x(n/2) is linear/nonlinear and time variant /time invariant
B	**Solve any One each** **10 marks**
i.	State any five properties of DFT.
ii.	Let x(n)= {1,2,3,4,5,6,7} and h(n)={1,0,2} perform linear convolution using overlap save method.

Q4.	**Solve any Two Questions out of Three 10 marks each**
A	*Perform histogram equalization on the following image histogram and plot original and equalized histograms.*
B	*Write Short note on edge detection in detail*
C	*What is Image Processing? Explain fundamental steps in Digital Image Processing in detail.*

Gray Level	0	1	2	3	4	5	6	7
Number of pixel	550	300	0	0	0	200	325	225