University of Mumbai

Examination 2020

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **B.E. Computer Engineering**

Curriculum Scheme: 2016

Examination: BE Semester VII

Course Code: CSC701 and Course Name: Digital Signal & Image 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.	$\delta(n)$ =
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.	For a power signal, P = _____ and E =_____
Option A:	Finite,Infinite
Option B:	Finite, Non-zero
Option C:	Infinite,Infinite
Option D:	Finite,Finite
3.	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}
4.	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
5.	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}
6.	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
7.	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
8.	The total number of complex multiplications in FFT is _____
Option A:	$N/2\log_2 N$
Option B:	$N\log_2 N$
Option C:	N*N
Option D:	2N
9.	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
10.	To remove salt and pepper noise _____ is better than low pass filter
Option A:	min filter
Option B:	Laplacian Filter
Option C:	max Filter
Option D:	Median Filter
11.	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
12.	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
13.	Which of the following derivatives produce thick edge which is NOT desirable.
Option A:	First order derivatives
Option B:	Third order derivative
Option C:	Second order derivative

Option D:	Final order derivatives
14.	What is the Second Derivative of Image Sharpening called?
Option A:	Gaussian
Option B:	Laplacian
Option C:	Canny
Option D:	Sobel
15.	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
16.	If x(n)={1,2,3,4} what is a circular shifted signal x(-n+1)?
Option A:	{1,4,3,2}
Option B:	{4,1,2,3}
Option C:	{2,1,4,3}
Option D:	{4,3,2,1}
17.	A system whose output response is given by y(n) = x(n + 2)
Option A:	Memoryless System
Option B:	Memory-Based System
Option C:	Static System
Option D:	Step System
18.	Discrete Fourier Transform of impulse signal is _____
Option A:	0
Option B:	½
Option C:	1
Option D:	N
19.	The discrete fourier transform of circular convolution of two signals x(n) and h(n) is equivalent to _____.
Option A:	Multiplication of DFTs of two sequences
Option B:	Addition of DFTs of two sequence
Option C:	Squaring of DFTs of two sequences
Option D:	Division of DFTs of two sequences
20.	The first M-1 values of the output sequence in every step of Overlap save method of filtering of long sequence are _____
Option A:	added
Option B:	discarded
Option C:	appended

Option D:	overlapped

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.	**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.* **Gray Level** 0 1 2 3 4 5 6 7 **Number of pixel** 550 300 0 0 0 200 325 225
B	*Write Short note on edge detection in detail*
C	*What is Image Processing? Explain fundamental steps in Digital Image Processing in detail.*