Course/Branch: B.E/EEE	**Year / Semester** :III/V	Format No.	NAC/TLP-07a.13
Subject Code :EE8591	**Subject Name** :Digital Signal Processing	Rev. No.	02
Unit No :3	**Unit Name :Discrete Fourier Transform and Computation**	Date	30/09/20

OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1.	Which of the following is true regarding the number of computations requires to compute an N-point DFT? **a) N^2 complex multiplications and N(N-1) complex additions** b) N^2 complex additions and N(N-1) complex multiplications c) N^2 complex multiplications and N(N+1) complex additions d) N^2 complex additions and N(N+1) complex multiplications	L1
2.	What is the DFT of the four point sequence x(n)={0,1,2,3}? a) {6,-2+2j-2,-2-2j} b) {6,-2-2j,2,-2+2j} **c) {6,-2+2j,-2,-2-2j}** d) {6,-2-2j,-2,-2+2j}	L4
3.	If $W_4^{100}=W_x^{200}$, then what is the value of x? a) 2 b) 4 **c) 8** d) 16	L2
4.	If x(n) and X(k) are an N-point DFT pair, then x(n+N)=x(n). **a) True** b) False	L1
5.	If x(n) and X(k) are an N-point DFT pair, then X(k+N)=? a) X(-k) b) -X(k) **c) X(k)** d) None of the mentioned	L1
6.	If x(n) is a real sequence and X(k) is its N-point DFT, then which of thefollowing is true? a) X(N-k)=X(-k)	L2

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	b) X(N-k)=X*(k) c) X(-k)=X*(k) **d) All of the mentioned**	
7.	If x(n) is real and odd, then what is the IDFT of the given sequence? **a) j1N∑N−1k=0x(k)sin2πknN** b) 1N∑N−1k=0x(k)cos2πknN c) −j1N∑N−1k=0x(k)sin2πknN d) None of the mentioned	L2
8.	If X(k) is the N-point DFT of a sequence x(n), then what is the DFT of x*(n)? a) X(N-k) b) X*(k) **c) X*(N-k)** d) None of the mentioned	L2
9.	If X(k) is the N-point DFT of a sequence x(n), then circular time shift property is that N-point DFT of $x((n-l))_N$ is $X(k)e^{-j2\pi kl/N}$. **a) True** b) False	L1
10.	By means of the DFT and IDFT, determine the response of the FIR filter with impulse response h(n)={1,2,3} to the input sequence x(n)={1,2,2,1}? a) {1,4,11,9,8,3} **b) {1,4,9,11,8,3}** c) {1,4,9,11,3,8} d) {1,4,9,3,8,11}	L3
11.	In Overlap save method of long sequence filtering, what is the length of the input sequence block? a) L+M+1 b) L+M **c) L+M-1** d) None of the mentioned	L1

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12.	What is the sequence y(n) that results from the use of four point DFTs if the impulse response is h(n)={1,2,3} and the input sequence x(n)={1,2,2,1}? a) {9,9,7,11} b) {1,4,9,11,8,3} c) {7,9,7,11} **d) {9,7,9,11}**	L4
13.	If the signal to be analyzed is an analog signal, we would pass it through an anti-aliasing filter with B as the bandwidth of the filtered signal and then the signal is sampled at a rate _____ a) $F_s \leq 2B$ b) $F_s \leq B$ **c) $F_s \geq 2B$** d) $F_s = 2B$	L2
14.	What is the highest frequency that is contained in the sampled signal? a) 2Fs **b) $F_s/2$** c) F_s d) None of the mentioned	L2
15.	If {x(n)} is the signal to be analyzed, limiting the duration of the sequence to L samples, in the interval $0 \leq n \leq L-1$, is equivalent to multiplying {x(n)} by? a) Kaiser window b) Hamming window c) Hanning window **d) Rectangular window**	L1
16.	What is the Fourier transform of rectangular window of length L? a) sin(ωL2)sin(ω2)ejω(L+1)/2 b) sin(ωL2)sin(ω2)ejω(L−1)/2 **c) sin(ωL2)sin(ω2)e−jω(L−1)/2** d) None of the mentioned	L2

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17.	Which of the following is the advantage of Hanning window over rectangular window? a) More side lobes **b) Less side lobes** c) More width of main lobe d) None of the mentioned	L1
18.	Which of the following is the disadvantage of Hanning window over rectangular window? a) More side lobes b) Less side lobes **c) More width of main lobe** d) None of the mentioned	L2
19.	The condition with less number of samples L should be avoided. **a) True** b) False	L1
20.	Which of the following is true regarding the number of computations required to compute an N-point DFT? **a) N^2 complex multiplications and N(N-1) complex additions** b) N^2 complex additions and N(N-1) complex multiplications c) N^2 complex multiplications and N(N+1) complex additions d) N^2 complex additions and N(N+1) complex multiplications	L2
21.	$W_N^{k+N/2}$=? a) W_N^k **b) $-W_N^k$** c) W_N^{-k} d) None of the mentioned	L2
22.	If we split the N point data sequence into two N/2 point data sequences $f_1(n)$ and	L1

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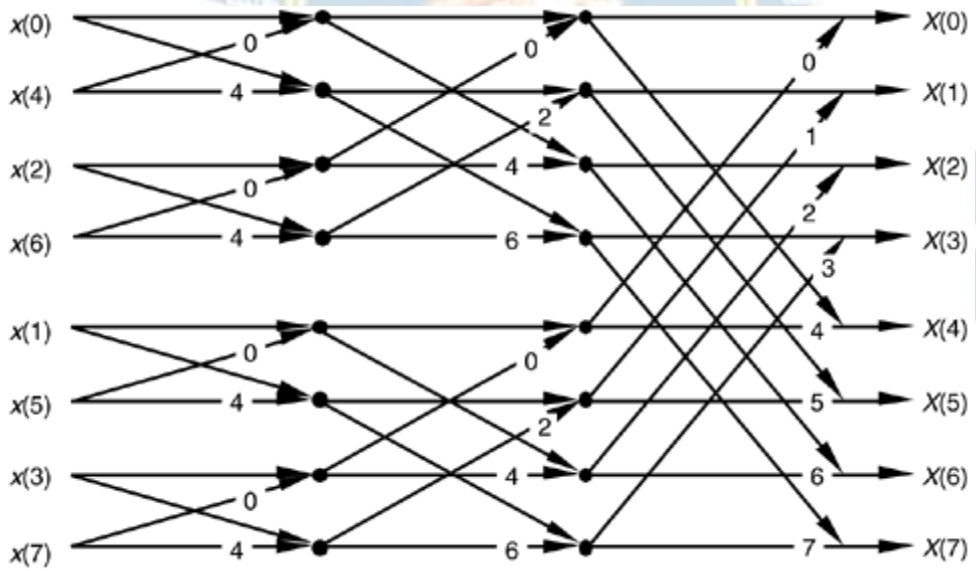
	$f_2(n)$ corresponding to the even numbered and odd numbered samples of x(n) and $F_1(k)$ and $F_2(k)$ are the N/2 point DFTs of $f_1(k)$ and $f_2(k)$ respectively, then what is the N/2 point DFT X(k) of x(n)? a) $F_1(k)+F_2(k)$ b) $F_1(k)-W_N^k F_2(k)$ **c) $F_1(k)+W_N^k F_2(k)$** d) None of the mentioned	
23.	The total number of complex multiplications required to compute N point DFT by radix-2 FFT is? **a) $(N/2)\log_2 N$** b) $N\log_2 N$ c) $(N/2)\log N$ d) None of the mentioned	L2
24.	The following butterfly diagram is used in the computation of _____  a)**Decimation-in-time FFT** b) Decimation-in-frequency FFT c) All of the mentioned d) None of the mentioned	L4

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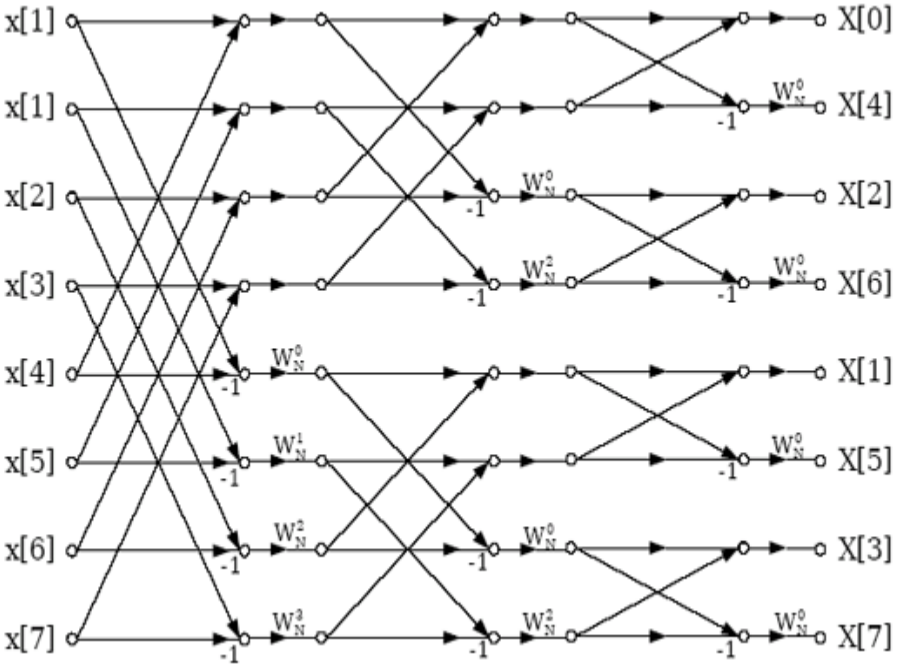
25.	How many complex multiplications are required to compute X(k)? a) N(N+1) b) N(N-1)/2 c) N2/2 **d) N(N+1)/2**	L1
26.	If $x_1(n)$ and $x_2(n)$ are two real valued sequences of length N, and let x(n) be a complex valued sequence defined as $x(n)=x_1(n)+jx_2(n)$, $0\leq n\leq N-1$, then what is the value of $x_1(n)$? a) x(n)−x∗(n)2 **b) x(n)+x∗(n)2** c) x(n)−x∗(n)2j d) x(n)+x∗(n)2j	L2
27.	The following butterfly diagram is used in the computation of _____  a) Decimation-in-time FFT **b) Decimation-in-frequency FFT**	L4

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	c) All of the mentioned d) None of the mentioned	
28.	If X(k) is the DFT of x(n) which is defined as $x(n)=x_1(n)+jx_2(n)$, $0\leq n\leq N-1$, then what is the DFT of $x_1(n)$? a) $12[X*(k)+X*(N-k)]$ b) $12[X*(k)-X*(N-k)]$ **c) $12j[X*(k)-X*(N-k)]$** d) $12j[X*(k)+X*(N-k)]$	L1
29.	How many complex additions are required to be performed in linear filtering of a sequence using FFT algorithm? a) (N/2)logN **b) $2N\log_2 N$** c) $(N/2)\log_2 N$ d) $N\log_2 N$	L2
30.	What is the total number of quantization errors in the computation of single point DFT of a sequence of length N? a) 2N **b) 4N** c) 8N d) 12N	L1