University of Mumbai
Examination 2020- Inter Cluster

Program: BE Instrumentation Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: ISC604 and Course Name: Digital Signal Processing

Time: 1hour Max. Marks: 50

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Note to the students:- All Questions are compulsory and carry equal marks .

Q1.	1. If x(n) and X(k) are an N-point DFT pair, then X(k+N)=?
Option A:	X(-k)
Option B:	-X(k)
Option C:	X(k)
Option D:	X(K+N)
Q2.	If $X_1(k)$ and $X_2(k)$ are the N-point DFTs of $X_1(n)$ and $x_2(n)$ respectively, then what is the N-point DFT of $x(n)=ax_1(n)+bx_2(n)$?
Option A:	$X_1(ak)+X_2(bk)$
Option B:	$aX_1(k)+bX_2(k)$
Option C:	$e^{ak}X_1(k)+e^{bk}X_2(k)$
Option D:	$X_1(k)+X_2(k)$
Q3.	If x(n) is a real sequence and X(k) is its N-point DFT, then which of the following is true?
Option A:	X(N-k)=X(-k)
Option B:	X(N-k)=X*(-k)
Option C:	X(-k)=X*(-k)
Option D:	X(K)=X(-K)
Q4.	is the circular convolution of the sequences $X_1(n)=\{2,1,2,1\}$ and $x_2(n)=\{1,2,3,4\}$?
Option A:	{14,14,16,16}
Option B:	{16,16,14,14}
Option C:	{2,3,6,4}
Option D:	{14,16,14,16}
Q5.	What is the DFT of the sequences $X_1(n)=\{2,1,2,1\}$
Option A:	{6,0,2,0}
Option B:	{14,16,14,16}
Option C:	{14,14,16,16}
Option D:	{12,11,12,11}
Q6.	. Which of the following is a frequency domain specification?
Option A:	$0 \geq 20 \log\|H(j\Omega)\|$
Option B:	$H(j\omega)$

Option C:	$\log\|H(j\Omega)\| \leq KS$
Option D:	H(S)
Q7.	What is the lowest order of the Butterworth filter with a pass band gain K_P=-1 dB at Ω_P=4 rad/sec and stop band attenuation greater than or equal to 20dB at Ω_S = 8 rad/sec?
Option A:	4
Option B:	5
Option C:	6
Option D:	3
Q8.	What is the cutoff frequency of the Butterworth filter with a pass band gain K_P=-1 dB at Ω_P=4 rad/sec and stop band attenuation greater than or equal to 20dB at Ω_S=8 rad/sec?
Option A:	3.5787 rad/sec
Option B:	1.069 rad/sec
Option C:	6 rad/sec
Option D:	4.5787 rad/sec
Q9.	What is the stop band frequency of the normalized low pass Butterworth filter used to design a analog band pass filter with -3.0103dB upper and lower cutoff frequency of 50Hz and 20KHz and a stop band attenuation 20dB at 20Hz and 45KHz?
Option A:	2 rad/sec
Option B:	2.25 Hz
Option C:	2.25 rad/sec
Option D:	2 Hz
Q10.	. What is the order of the normalized low pass Butterworth filter used to design a analog band pass filter with -3.0103dB upper and lower cutoff frequency of 50Hz and 20KHz and a stop band attenuation 20dB at 20Hz and 45KHz?
Option A:	2
Option B:	3
Option C:	4
Option D:	5
Q11.	What is the formula for chebyshev polynomial $T_N(x)$ in recursive form?
Option A:	$2T_{N-1}(x) - T_{N-2}(x)$
Option B:	$2T_{N-1}(x) + T_{N-2}(x)$
Option C:	$2xT_{N-1}(x) + T_{N-2}(x)$
Option D:	$2xT_{N-1}(x) - T_{N-2}(x)$
Q12.	What is the value of chebyshev polynomial of degree 0?
Option A:	1
Option B:	0
Option C:	-1
Option D:	2

Q13.	What is the value of chebyshev polynomial of degree 0?
Option A:	1
Option B:	0
Option C:	-1
Option D:	2
Q14.	If all the poles have small magnitudes, then the rate of decay of signal is _____
Option A:	Slow
Option B:	Constant
Option C:	Rapid
Option D:	Random
Q15.	If one or more poles are located near the unit circle, then the rate of decay of signal is _____
Option A:	Slow
Option B:	Constant
Option C:	Rapid
Option D:	Random
Q16.	. If the ROC of the system function is the exterior of a circle of radius $r < \infty$, including the point $z = \infty$, then the system is said to be _____
Option A:	Stable
Option B:	Causal
Option C:	Anti causal
Option D:	None of the mentioned
Q17.	A linear time invariant system is said to be BIBO stable if and only if the ROC of the system function _____
Option A:	Includes unit circle
Option B:	Excludes unit circle
Option C:	Is an unit circle
Option D:	None of the mentioned
Q18.	In bilinear transformation, the left-half s-plane is mapped to which of the following in the z-domain?
Option A:	Entirely outside the unit circle $\|z\|=1$
Option B:	Partially outside the unit circle $\|z\|=1$
Option C:	Partially inside the unit circle $\|z\|=1$
Option D:	Entirely inside the unit circle $\|z\|=1$
Q19.	If all the poles of H(z) are inside the unit circle, then the system is said to be _____
Option A:	Only causal
Option B:	Only BIBO stable
Option C:	BIBO stable and causal
Option D:	BIBO unstable

Q20.	Which of the following rule is used in the bilinear transformation?
Option A:	Simpson's rule
Option B:	Backward difference
Option C:	Forward difference
Option D:	Trapezoidal rule
Q21.	. If $s=\sigma+j\Omega$ and $z=re^{j\omega}$, then what is the condition on σ if r<1?
Option A:	$\sigma > 0$
Option B:	$\sigma < 0$
Option C:	$\sigma > 1$
Option D:	$\sigma < 1$
Q22.	If $s=\sigma+j\Omega$ and $z=re^{j\omega}$ and r=1, then which of the following inference is correct?
Option A:	LHS of the s-plane is mapped inside the circle, |z|=1
Option B:	RHS of the s-plane is mapped outside the circle, |z|=1
Option C:	Imaginary axis in the s-plane is mapped to the circle, |z|=1
Option D:	|Z|=1, for all
Q23.	If $s=\sigma+j\Omega$ and $z=re^{j\omega}$, then what is the condition on σ if r>1?
Option A:	$\sigma > 0$
Option B:	$\sigma < 0$
Option C:	$\sigma > 1$
Option D:	$\sigma < 1$
Q24.	The cost of the digital processors is cheaper because
Option A:	Processor allows time sharing among a number of signals
Option B:	The hardware is cheaper
Option C:	Require less maintenance
Option D:	Less power consumption
Q25.	In DSP processors, which among the following maintains the track of addresses of input data as well as the coefficients stored in data and program memories?
Option A:	Data Address Generators (DAGs)
Option B:	Program sequences
Option C:	Barrel Shifter
Option D:	MAC