

NADAR SARASWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch : B.E / ECE	Year / Semester : III / V	Format No.	NAC/TLP-07a.13
Subject Code : EC8553	Subject Name : Discrete Time Signal Processing	Rev. No.	02
Unit No : 2	Unit Name : Infinite Impulse Response Filter	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1.	<p>When the frequency band is selected we can specify the sampling rate and the characteristics of the pre filter, which is also called as __ filter?</p> <p>a) Analog filter b) Anti aliasing filter c) Both a& b d) None of the mentioned</p> <p>Answer: b</p>	L2
2.	<p>What are the main characteristics of Anti aliasing filter?</p> <p>a) Ensures that bandwidth of signal to be sampled is limited to frequency range. b) To limit the additive noise spectrum and other interference, which corrupts the signal. c) Both a& b d) None of the mentioned</p> <p>Answer: c</p>	L2
3.	<p>In general, a digital system designer has better control of tolerances in a digital signal processing system than an analog system designer who is designing an equivalent analog system.</p> <p>a) True b) False</p> <p>Answer: a</p>	L4
4.	<p>The selection of the sampling rate $F_s=1/T$, where T is the sampling interval, not only determines</p> <p>the highest frequency ($F_s/2$) that is preserved in the analog signal, but also serves as a scale factor</p> <p>that influences the design specifications for digital filters</p> <p>a) True b) False</p> <p>Answer: a</p>	L5

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5.	<p>What is the configuration of system for digital processing of an analog signal?</p> <p>a) Analog signal Pre-filter ->D/A Converter -> Digital Processor -> A/D Converter -> Post-filter</p> <p>b) Analog signal Pre-filter ->A/D Converter -> Digital Processor -> D/A Converter -> Post-filter</p> <p>c) Analog signal Post-filter ->D/A Converter -> Digital Processor -> A/D Converter -> Pre-filter</p> <p>d) None of the mentioned</p> <p>Answer: b</p>	L1
6.	<p>In DM, further the two integrators at encode are replaced by one integrator placed before comparator, and then such system is called?</p> <p>a) System-delta modulation</p> <p>b) Sigma-delta modulation</p> <p>c) Source-delta modulation</p> <p>d) None of the mentioned</p> <p>Answer: b</p>	L1
7.	<p>In IIR Filter design by the Bilinear Transformation, the Bilinear Transformation is a mapping from</p> <p>a) Z-plane to S-plane</p> <p>b) S-plane to Z-plane</p> <p>c) S-plane to J-plane</p> <p>d) J-plane to Z-plane</p> <p>Answer: b</p>	L2
8.	<p>it is clear that transformation occurs from s-plane to z-plane</p> <p>2. In Bilinear Transformation, aliasing of frequency components is been avoided.</p>	L1

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	<p>a) True</p> <p>b) False</p> <p>Answer: a</p>	
9.	<p>Is IIR Filter design by Bilinear Transformation is the advanced technique when compared to other design techniques?</p> <p>a) True</p> <p>b) False</p> <p>Answer: True</p>	L1
10.	<p>In the Bilinear Transformation mapping, which of the following are correct?</p> <p>a) All points in the LHP of s are mapped inside the unit circle in the z-plane</p> <p>b) All points in the RHP of s are mapped outside the unit circle in the z-plane</p> <p>c) Both a & b</p> <p>d) None of the mentioned</p> <p>Answer: C</p>	L3
11.	<p>The lower and upper limits on the convolution sum reflect the causality and finite duration characteristics of the filter.</p> <p>a) True</p> <p>b) False</p> <p>Answer: a</p>	L2
12.	<p>In tapped delay line filter, the tapped line is also known as _____</p> <p>a. Pick-on node</p> <p>b. Pick-off node</p>	L3

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	<p>c. Pick-up node</p> <p>d. Pick-down node</p> <p>ANSWER:(b) Pick-off node</p>	
13.	<p>How is the sensitivity of filter coefficient quantization for FIR filters?</p> <p>a. Low</p> <p>b. Moderate</p> <p>c. High</p> <p>d. Unpredictable</p> <p>ANSWER: (a) Low</p>	L1
14.	<p>Anti-imaging filter with cut-off frequency $\omega_c = \pi/ I$ is specifically used _____ upsampling process for the removal of unwanted images.</p> <p>a. Before</p> <p>b. At the time of</p> <p>c. After</p> <p>d. All of the above</p> <p>ANSWER: (c) After</p>	L1
15.	<p>Which of the following is a frequency domain specification?</p> <p>a) $0 \geq 20 \log H(j\Omega)$</p> <p>b) $20 \log H(j\Omega) \geq KP$</p> <p>c) $20 \log H(j\Omega) \leq KS$</p> <p>d) All of the mentioned</p>	L2

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	ANSWER: D	
16.	What is the expression for cutoff frequency in terms of stop band gain? a) $\Omega_S(10-KS/10-1)^{1/2N}$ b) $\Omega_S(10-KS/10+1)^{1/2N}$ c) $\Omega_S(10KS/10-1)^{1/2N}$ d) None of the mentioned Answer: c	L3
17.	The cutoff frequency of the low pass Butterworth filter is the arithmetic mean of the two cutoff frequencies as found above. a) True b) False Answer: a	L1
18.	What is the lowest order of the Butterworth filter with a pass band gain $K_P = -1$ dB at $\Omega_P = 4$ rad/sec and stop band attenuation greater than or equal to 20dB at $\Omega_S = 8$ rad/sec? a) 4 b) 5 c) 6 d) 3 Answer: b	L5
19.	What is the value of chebyshev polynomial of degree 0? a) 1 b) 0 c) -1 d) 2 Answer: a	L1
20.	What is the value of chebyshev polynomial of degree 1? a) 1	L1

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	<p>b) x</p> <p>c) -1</p> <p>d) -x</p> <p>Answer: b</p> <p>Explanation: We know that a chebyshev polynomial of degree N is defined as</p> $T_N(x) = \cos(N \cos^{-1}x), x \leq 1 \quad \cosh(N \cosh^{-1}x), x > 1$ <p>For a degree 1 chebyshev filter, the polynomial is obtained as</p> $T_0(x) = \cos(\cos^{-1}x) = x$	
21.	<p>What is the value of chebyshev polynomial of degree 3?</p> <p>a) $3x^3+4x$</p> <p>b) $3x^3-4x$</p> <p>c) $4x^3+3x$</p> <p>d) $4x^3-3x$</p> <p>Answer: d</p>	L2
22.	<p>Chebyshev polynomials of odd orders are _____</p> <p>a) Even functions</p> <p>b) Odd functions</p> <p>c) Exponential functions</p> <p>d) Logarithmic functions</p> <p>Answer: b</p>	L3
23.	<p>Which of the following rule is used in the bilinear transformation?</p> <p>a) Simpson's rule</p> <p>b) Backward difference</p>	L1

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	<p>c) Forward difference</p> <p>d) Trapezoidal rule</p> <p>Answer: d</p>	
24.	<p>Which of the following substitution is done in Bilinear transformations?</p> <p>a) $s = 2T[1+z^{-1}-1-z^{-1}]$</p> <p>b) $s = 2T[1+z^{-1}-1+z^{-1}]$</p> <p>c) $s = 2T[1-z^{-1}-1+z^{-1}]$</p> <p>d) None of the mentioned</p> <p>Answer: c</p>	L5
25.	<p>In bilinear transformation, the left-half s-plane is mapped to which of the following in the z-domain?</p> <p>a) Entirely outside the unit circle $z =1$</p> <p>b) Partially outside the unit circle $z =1$</p> <p>c) Partially inside the unit circle $z =1$</p> <p>d) Entirely inside the unit circle $z =1$</p> <p>Answer: d</p>	L1
26.	<p>The equation $s = 2T[1-z^{-1}-1+z^{-1}]$ is a true frequency-to-frequency transformation.</p> <p>a) True</p> <p>b) False</p> <p>Answer: a</p>	L1
27.	<p>If $s=\sigma+j\Omega$ and $z=rej\omega$, then what is the condition on σ if $r<1$?</p> <p>a) $\sigma > 0$</p> <p>b) $\sigma < 0$</p> <p>c) $\sigma > 1$</p> <p>d) $\sigma < 1$</p> <p>Answer: b</p>	L2
28.	<p>What is the expression for the digital frequency when $r=1$?</p> <p>a) $1T\tan(\Omega T/2)$</p> <p>b) $2T\tan(\Omega T/2)$</p> <p>c) $1T\tan^{-1}(\Omega T/2)$</p> <p>d) $2T\tan^{-1}(\Omega T/2)$</p> <p>Answer: d</p>	L3
29.	<p>What is the kind of relationship between Ω and ω?</p> <p>a) Many-to-one</p> <p>b) One-to-many</p> <p>c) One-to-one</p>	L1

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	d) Many-to-many Answer: c	
30.	<p>What is the first backward difference of $y(n)$?</p> <p>a) $[y(n)+y(n-1)]/T$ b) $[y(n)+y(n+1)]/T$ c) $[y(n)-y(n+1)]/T$ d) $[y(n)-y(n-1)]/T$</p> <p>Answer: d</p>	L2
31.	<p>The s plane and z plane are related as</p> <p>a. $z = e^{sT}$ b. $z = e^{2sT}$ c. $z = 2e^{sT}$ d. $z = e^{sT}/2$</p> <p>ANSWER: (a) $z = e^{sT}$</p>	L2
32.	<p>What is the center of the circle represented by the image of $j\Omega$ axis of the s-domain?</p> <p>a) $z=0$ b) $z=0.5$ c) $z=1$ d) none of the mentioned</p> <p>Answer: b</p>	L3
33.	<p>The anti causal sequences have _____ components in the left hand sequences.</p> <p>a. Positive b. Negative c. Both a and b d. None of the above</p> <p>ANSWER: (a) Positive</p>	L1
34.	<p>What is the radius of the circle represented by the image of $j\Omega$ axis of the s-domain?</p> <p>a) 0.75 b) 0.25</p>	L2

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	c) 1 d) 0.5 Answer: d	
35.	An analog high pass filter can be mapped to a digital high pass filter. a) True b) False Answer: b	L1

