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DEPARTMENT OF ELECTRICAL ENGINEERING		
COURSE NAME: Digital Signal Processing	TERM: Spring 2020	QUIZ: after mid
COURSE CODE: EE-330	SEMESTER: VI	TIME DURATION: home based 01
RESOURCE PERSON: Ismat Hira	SESSION: 2017-2021	MAX. MARKS: 50

Sr. No.	Questions	CLO	PLO	Taxonomy Level	Marks
1	This set of Control Systems Multiple Choice Questions & Answers (MCQs) focuses on “The Z-Transform”. 1. The discrete-time signal x (n) = $(-1)^n$ is periodic with fundamental period a)6 b)4 c)2 d)0 . 2. The frequency of a continuous time signal x (t) changes on transformation from x (t) to x (α t), α > 0 by a factor a)α b)1/α c)$α^2$ d)α . 3. Two sequences x1 (n) and x2 (n) are related by x2 (n) = x1 (- n). In the z- domain, their ROC’s are a) The same b) Reciprocal of each other c) Negative of each other d) Complements of each other . 4. The ROC of z-transform of the discrete time	CLO2	1	3	50 (01 for correct option and 04 for explanation)

	sequence x(n) = $\frac{1}{3}^{n} u(n)$-$\frac{1}{2}^{n} u(-n-1)$ is: a)1/3>|z|<1/2 b) |z|>1/2 c) |z|<1/3 d) 2>|z|<3 . 5. Which one of the following is the correct statement? The region of convergence of z-transform of x[n] consists of the values of z for which x[n] is: a) Absolutely integrable b) Absolutely summable c) Unity d) <1 . 6. The region of convergence of the z-transform of a unit step function is: a) |z|>1 b) |z|<1 c) (Real part of z)>0 d) (Real part of z)<0 . 7. If the region of convergence of x1[n]+x2[n] is 1/>|z|<2/3, the region of convergence of x1[n]-x2[n] includes: a) 1/3>|z|<3 b) 2/3>|z|<3 c) 3/2>|z|<3 d) 1/3>|z|<2/3 . 8. A sequence x (n) with the z-transform X (z) = Z^4 + Z^2 – 2z + 2 – $3Z^{-4}$ is applied to an input to a linear time invariant system with the impulse response h (n) = 2δ (n-3). The output at n = 4 will be: a) -6 b) Zero c) 2				

	d) -4 9. H (z) is discrete rational transfer function. To ensure that both H(z) and its inverse are stable: a) Poles must be inside the unit circle and zeros must be outside the unit circle b) Poles and zeroes must be inside the unit circle c) Poles and zeroes must be outside the unit circle d) Poles must be outside the unit circle and zeros must be inside the unit circle 10. Z and Laplace transform are related by: a) s = ln z b) s =ln z/T c) s =z d) s= T/ln z				

DEPARTMENT OF ELECTRICAL ENGINEERING		
COURSE NAME: Digital Signal Processing	TERM: Spring 2020	QUIZ: after mid
COURSE CODE: EE-3	SEMESTER: VI	TIME DURATION: home based 02
RESOURCE PERSON: Ismat Hira	SESSION: 2017-2021	MAX. MARKS: 50

Sr. No.	Questions	CLO	PLO	Taxonomy Level	Marks
1	This set of Digital Signal Processing Multiple Choice Questions & Answers (MCQs) focuses on "Design of IIR Filters from Analog Filters". 1. What is the duration of the unit sample response of a digital filter? a) Finite b) Infinite c) Impulse(very small) d) Zero . 2. Which of the following methods are used to convert analog filter into digital filter? a) Approximation of Derivatives b) Bilinear transformation c) Impulse invariance d) All of the mentioned . 3. Which of the following is the difference equation of the FIR filter of length M, input x(n) and output y(n)? a) $y(n)=\sum_{k=0}^{M+1} b_k x(n+k)$ b) $y(n)=\sum_{k=0}^{M+1} b_k x(n-k)$ c) $y(n)=\sum_{k=0}^{M-1} b_k x(n-k)$ d) None of the mentioned . 4. What is the relation between h(t) and $H_a(s)$? a) $H_a(s)=\int_{-\infty}^{\infty} h(t)e^{-st}dt$ b) $H_a(s)=\int_{0}^{\infty} h(t)e^{st}dt$ c) $H_a(s)=\int_{-\infty}^{\infty} h(t)e^{st}dt$ d) None of the mentioned .	CLO 3	3	4	50 (01 for correct option and 04 for explanation)

	5. Which of the following is a representation of system function? a) Normal system function b) Laplace transform c) Rational system function d) All of the mentioned . 6. For an analog LTI system to be stable, where should the poles of system function H(s) lie? a) Right half of s-plane b) Left half of s-plane c) On the imaginary axis d) At origin . 7. If the conversion technique is to be effective, the jΩ axis in the s-plane should map into the unit circle in the z-plane. a) True b) False . 8. If the conversion technique is to be effective, then the LHP of s-plane should be mapped into _____ a) Outside of unit circle b) Unit circle c) Inside unit circle d) Does not matter . 9. Physically realizable and stable IIR filters cannot have linear phase. a) True b) False . 10. What is the condition on the system function of a linear phase filter? a) $H(z)=z^{-N}H(z^{-1})$ b) $H(z)=z^{N}H(z^{-1})$ c) $H(z)=\pm z^{N}H(z^{-1})$ d) $H(z)=\pm z^{-N}H(z^{-1})$.				

	advertisement 11. If the filter is in linear phase, then filter would have a mirror-image pole outside the unit circle for every pole inside the unit circle. a) True b) False . 12. What is the order of operations to be performed in order to realize linear phase IIR filter? (i) Passing x(-n) through a digital filter H(z) (ii) Time reversing the output of H(z) (iii) Time reversal of the input signal x(n) (iv) Passing the result through H(z) a) (i),(ii),(iii),(iv) b) (iii),(i),(ii),(iv) c) (ii),(iii),(iv),(i) d) (i),(iii),(iv),(ii) . 13. When an application requires a linear phase filter, it should be an FIR filter. a) True b) False . **1) The Elliptic filters have** **1) Flat pass band** **2) Flat stop band** **3) Equiripple pass band** **4) Equiripple stop band** **a.** 1 and 2 are correct **b.** 3 and 4 are correct **c.** 2 and 3 are correct **d.** All the four are correct **2) The Chebyshev filters have** **1) Flat pass band**				

2) Flat stop band
3) Equiripple pass band
4) Tapering stop band

a. 1 and 2 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

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3) The magnitude response of Butterworth filter has

1) Flat stop band
2) Flat pass band
3) Tapering pass band
4) Tapering stop band

a. 1 and 2 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

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4) The frequency warping is referred as

1) lower frequencies in analog domain expanded in digital domain
2) lower frequencies in digital domain expanded in analog domain
3) non linear mapping
4) compression of higher frequencies

a. 1, 3 and 4 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

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5) The transformation technique in which there is one to one mapping from s-domain to z-domain is

a. Approximation of derivatives

b. Impulse invariance method
c. Bilinear transformation method
d. Backward difference for the derivative

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6) The impulse invariant method is obtained by

a. Sampling the impulse response of an equivalent analog filter
b. Taking backward difference for the derivative
c. Mapping from s-domain to z-domain
d. Approximation of derivatives

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7) The filter that may not be realized by approximation of derivatives techniques are

1) Band pass filters
2) High pass filters
3) Low pass filters
4) Band reject filters

a. 1, 2 and 3 are correct
b. 2 and 4 are correct
c. 2 and 3 are correct
d. All the four are correct

8) IIR filter design by approximation of derivatives has the limitations

1) Used only for transforming analog high pass filters
2) Used for band pass filters having smaller resonant frequencies
3) Used only for transforming analog low pass filters
4) Used for band pass filters having high resonant frequencies

a. 1, 2 and 3 are correct
b. 1 and 2 are correct
c. 2 and 3 are correct
d. All the four are correct

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	9) For a system function H(s) to be stable **a.** The zeros lie in left half of the s plane **b.** The zeros lie in right half of the s plane **c.** The poles lie in left half of the s plane **d.** The poles lie in right half of the s plane					
	10) The IIR filter designing involves **a.** Designing of analog filter in analog domain and transforming into digital domain **b.** Designing of digital filter in analog domain and transforming into digital domain **c.** Designing of analog filter in digital domain and transforming into analog domain **d.** Designing of digital filter in digital domain and transforming into analog domain					