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 :4	**Unit Name** :**Design of Digital filters**	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 used in the realization of a system? a) Delay elements b) Multipliers c) Adders **d) All of the mentioned**	L1
2.	Computational complexity refers to the number of _____ a) Additions **b) Arithmetic operations** c) Multiplications d) None of the mentioned	L2
3.	What is the general system function of an FIR system? a) ∑M−1k=0bkx(n−k) b) ∑Mk=0bkz−k **c) ∑M−1k=0bkz−k** d) None of the mentioned	L3
4.	Where does the poles of the system function of the second filter locate? a) $e^{j2\pi(k+\alpha)M}$ **b) $e^{j2\pi(k+\alpha)/M}$** c) $e^{j2\pi(k-\alpha)/M}$ d) $e^{j\pi(k+\alpha)/M}$	L3
5.	Which of the following is the application of lattice filter? a) Digital speech processing b) Adaptive filter c) Electroencephalogram **d) All of the mentioned**	L1
6.	If we consider a sequence of FIR filer with system function $H_m(z)=A_m(z)$, then what is the definition of the polynomial $A_m(z)$? a) 1+∑mk=0αm(k)z−k **b) 1+∑mk=1αm(k)z−k**	L3

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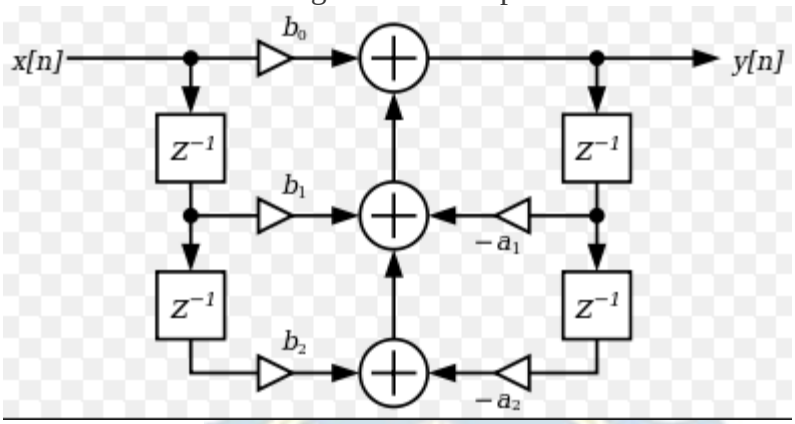
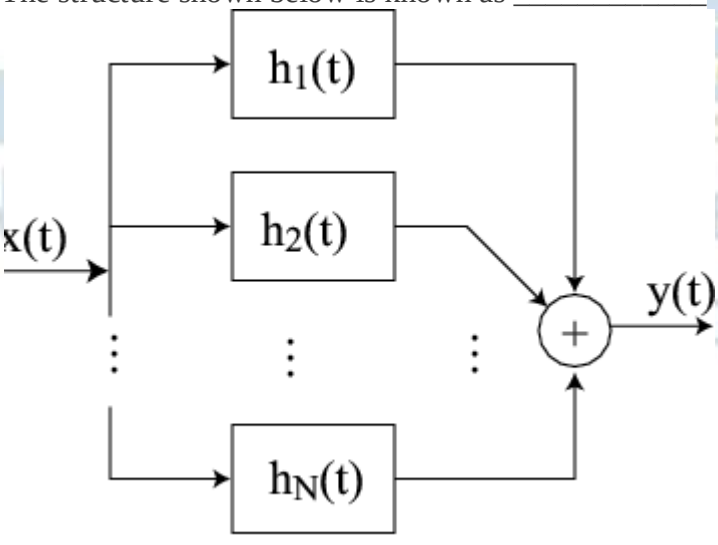
	c) $1+\sum_{mk=1}\alpha m(k)zk$ d) $\sum_{mk=0}\alpha m(k)z-k$	
7.	What does the structure given below represents?  a) Direct form-I b) Regular Direct form-II **c) Transposed direct form-II** d) None of the mentioned	L3
8.	The structure shown below is known as _____  **a) Parallel form structure** b) Cascade structure c) Direct form d) None of the mentioned	L3

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9.	The state space or the internal description of the system still involves a relationship between the input and output signals, what are the additional set of variables it also involves? a) System variables b) Location variables **c) State variables** d) None of the mentioned	L1
10.	What is the condition to call a number λ is an Eigen value of F and a nonzero vector U is the associated Eigen vector? a) (F+λI)U=0 **b) (F-λI)U=0** c) F-λI=0 d) None of the mentioned	L3
11.	If $(101.01)_2=(x)_{10}$, then what is the value of x? a) 505.05 b) 10.101 c) 101.01 **d) 5.25**	L1
12.	What is the resolution to cover a range of numbers x_{max}-x_{min} with 'b' number of bits? a) $(x_{max}+x_{min})/(2^b-1)$ b) $(x_{max}+x_{min})/(2^b+1)$ **c) $(x_{max}-x_{min})/(2^b-1)$** d) $(x_{max}-x_{min})/(2^b+1$	L3
13.	What is the binary equivalent of (-3/8)? a) $(10011)_2$ b) $(0011)_2$ c) $(1100)_2$ **d) $(1101)_2$**	L1
14.	If E=0 and M=0, then which of the following statement is true about X? a) Not a number b) Infinity c) Defined **d) Zero**	L2

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15.	What is the configuration of system for digital processing of an analog signal? a) Analog signal|| Pre-filter -> D/A Converter -> Digital Processor -> A/D Converter -> Post-filter **b) Analog signal|| Pre-filter -> A/D Converter -> Digital Processor -> D/A Converter -> Post-filter** c) Analog signal|| Post-filter -> D/A Converter -> Digital Processor -> A/D Converter -> Pre-filter d) None of the mentioned	L1
16.	What is the z-transform of sequence $\{d_q(n)\}$ i.e., $D_q(z)$= ? a) Hs(z)X(z)−Hn(z)E(z) **b) Hs(z)X(z)+Hn(z)E(z)** c) Hs(n)X(z)+Hn(n)E(z) d) Hn(z)X(z)−Hs(z)E(z)	L3
17.	If the input analog signal is within the range of the quantizer, the quantization error e_q (n) is bounded in magnitude i.e., $\|e_q(n)\| < \Delta/2$ and the resulting error is called? **a) Granular noise** b) Overload noise c) Particulate noise d) Heavy noise	L1
18.	What is the expression for SQNR which can be expressed in a logarithmic scale? **a) 10 log10Px/Pn** b) 10 log10Pn/Px c) 10 log2Px/Pn d) 2 log2Px/Pn	L3
19.	In IIR Filter design by the Bilinear Transformation, the Bilinear Transformation is a mapping from a) Z-plane to S-plane **b) S-plane to Z-plane** c) S-plane to J-plane d) J-plane to Z-plane	L2
20.	We use y{‘}(nT)=-ay(n/T)+bx(nT) to substitute for the derivative in	L3

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	y(nT) = T/2[y‘(nT)+y‘(nT−T)]+y(nT−T) and thus obtain a difference equation for the equivalent discrete-time system. With y(n) = y(nT) and x(n) = x(nT), we obtain the result as of the following? **a) (1+aT/2)Y(z)−(1−aT/2)y(n−1)=bT/2[x(n)+x(n−1)]** b) (1+aT/n)Y(z)−(1−aT/n)y(n−1)=bT/n[x(n)+x(n−1)] c) (1+aT/2)Y(z)+(1−aT/2)y(n−1)=bT/2(x(n)−x(n−1)) d) (1+aT/2)Y(z)+(1−aT/2)y(n−1)=bT/2(x(n)+x(n+1))	
21.	Which of the following is a frequency domain specification? a) $0 \geq 20 \log\|H(j\Omega)\|$ b) $20 \log\|H(j\Omega)\| \geq KP$ c) $20 \log\|H(j\Omega)\| \leq KS$ **d) All of the mentioned**	L2
22.	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? a) 4 **b) 5** c) 6 d) 3	L1
23.	What is the formula for chebyshev polynomial $T_N(x)$ in recursive form? a) $2T_{N-1}(x) – T_{N-2}(x)$ b) $2T_{N-1}(x) + T_{N-2}(x)$ c) $2xT_{N-1}(x) + T_{N-2}(x)$ **d) $2xT_{N-1}(x) – T_{N-2}(x)$**	L3
24.	The left half of the s-plane is mapped to which of the following in the z-domain? a) Outside the circle |z-0.5|=0.5 b) Outside the circle |z+0.5|=0.5 **c) Inside the circle |z-0.5|=0.5** d) Inside the circle |z+0.5|=0.5	L3
25.	What is the z-transform of the first backward difference equation of y(n)? a) (1+z−1/T) Y(z) **b) (1−z−1/T)Y(z)** c) (1+z1/T)Y(z)	L3

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	d) None of the mentioned	
26.	If a continuous time signal x(t) with spectrum X(F) is sampled at a rate $F_s=1/T$ samples per second, the spectrum of the sampled signal is _____ a) Non periodic repetition b) Non periodic non-repetition **c) Periodic repetition** d) None of the mentioned	L1
27.	When σ=0, then what is the condition on 'r'? a) 0<r<1 **b) r=1** c) r>1 d) None of the mentioned	L3
28.	Which of the following gives the equation for envelope delay? a) dΘ(ω)/dω b) Θ(ω) **c) -dΘ(ω)/dω** d) -Θ(ω)	L3
29.	Which of the following is true in the case of Butterworth filters? a) Smooth pass band b) Wide transition band c) Not so smooth stop band **d) All of the mentioned**	L1
30.	The lack of precise control of cutoff frequencies is a disadvantage of which of the following designs? **a) Window design** b) Chebyshev approximation c) Frequency sampling d) None of the mentioned	L2