Subject: Digital Signal Processing
Subject Code: 21EC42

Semester: IV
Max Marks: 50

Note: Answer any one full question from each part			M	CO	BTL
		PART A			
1	a)	Prove that the sampling of Fourier transform of a sequence x(n) results in a N point DFT using which both the sequence and the transform can be reconstructed.	10	CO1	L2
	b)	Determine 4 point circular convolution of the following sequences using DFT and IDFT method. x(n)={3,2,1,4} and h(n)={2,1,1,3}	10	CO1	L3
		OR			
2	a)	Compute 8 point DFT of the sequence x(n)=(1,1,1,1,1,1). Also plot Magnitude and Phase spectrum.	10	CO1	L3
	b)	Determine 4 point circular convolution of the following sequences using DFT and IDFT method. x(n)={1,0,5} and h(n)={0,5,1}	10	CO1	L3
		PART B			
3	a)	A sequence x(n)= {3,-1,2,4,-3,-2,0,1,-4,6,2,5} with 12 point DFT given by X(K). Evaluate the following functions of X(K) without computing the $$(i)\ X(0) \quad (ii)\ X(6) \quad (iii)\ \sum_{k=0}^{11} X(k) \quad (iv)\ \sum_{k=0}^{11} e^{-j\left(\frac{4\pi}{3}\right)} X(k) \quad (v)\ \sum_{k=0}^{11} |X(k)|^2$$ DFT.	12	CO2	L3
	b)	Find 4 point circular convolution of g(n)= {-3,2,4} and h(n)= {2,-4,0,1} using (i) Concentric circle method (ii) Matrix method	08	CO2	L3
	c)	Compute N point DFT of the following signals. (i)x(n)= a^n ; $0 \le n \le N-1$ (ii) x(n) = cos[$2\pi k_o n/N$]; $0 \le n \le N-1$	10	CO1	L2
		OR			
4	a)	Consider a finite duration sequence x(n)={0,1,2,3,4} i) Sketch the sequence s(n) with 6 point DFT S(K)=W_2^* X(K); $0 \le K \le 6$ ii) Determine the sequence y(n) with 6 point DFT Y(K)=Re[X(K)] iii) Determine the sequence v(n) with 6 point DFT V(K)=Im[X(K)]	10	CO2	L3
	b)	A 498 point DFT X(K) of a real valued sequence x(n) has the following DFT samples given by X(0)=2, X(11)=7+j3.1, X(K1)= -2.2-j1.5, X(112)= 3-j0.7, X(K2)= -4.7+j1.9, X(249)= 2.9, X(309)= -4.7-j1.9, X(K3)= 3+j0.7, X(412)= -2.2+j1.5 and X(K4)= 7-j3.1 Remaining DFT samples are assumed to be of zero value. Find the values of K1, K2, K3 and K4.	10	CO2	L3
	c)	State any five properties of DFT.	10	CO1	L1

Cognitive Levels of Bloom's Taxonomy

No.	CL1	CL2	CL3	CL4	CL5	CL6
Level	Remember	Understand	Apply	Analyze	Evaluate	Create

Course Outcomes

CO1	Determine response of LTI systems using time domain and DFT techniques.
CO2	Compute DFT of real and complex discrete time signals.
CO3	Compute DFT using FFT algorithms.
CO4	Design FIR and IIR Digital Filters.
CO5	Design of Digital Filters using DSP processor.

Course Coordinator

HOD