Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	[20]
	a	Compute the DFT of the four point sequence x(n)={0,1,2,3}	
	b	Explain Quantization and effects of truncation and rounding.	
	c	Compare IIR and FIR filters.	
	d	Explain the concept of pipelining in DSP processor.	
	e	Convert an analog filter with system function H(s) into digital IIR filter using Impulse Invariance method. $H(s) = 10 / (S^2 + 7S + 10)$	
2	a	Obtain the DFT of the sequence x(n)= {1,1,1,1,1,1,1,0}using DIT FFT algorithm.	[10]
	b	Obtain the linear convolution of the following sequences using overlap add method. x(n) = {1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1} and h(n) = {1, 2, 3}	[10]
3	a	Draw architectural block diagram of DSP processor and explain functions of each block.	[10]
	b	Design a Butterworth digital IIR low pass filter using BLT by assuming T=1 sec., to satisfy the following specifications $0.707 \leq \lvert H(e^{jw}) \rvert \leq 1.0; \quad 0 \leq w \leq 0.2\pi$ $\lvert H(e^{jw}) \rvert \leq 0.08; \quad 0.4\pi \leq w \leq \pi$	[10]
4	a	Design a FIR filter with hamming window for the following specifications: $H_d(w) = e^{-j3w} \quad -\pi/4 \leq w \leq \pi/4$ $= 0 \quad \pi/4 \leq w \leq \pi$	[10]
	b	Design Chebyshev analog filter with maximum pass band attenuation of 2.5dB at Ω_P = 20 rad/sec and stop band attenuation of 30 dB at Ω_S = 50 rad/sec.	[10]
5	a	Write a note on polyphase filters.	[10]
	b	Determine impulse response h(n) of a filter having desired frequency response $H_d(e^{-j3w}) = e^{-j(M-1)(w/2)} \quad$ for $0 \leq w \leq \pi/2$ $= 0 \quad$ for $\pi/2 \leq w \leq \pi$ M=7, use frequency sampling approach.	[10]
6	a	Write short note on: Application of DSP in speech processing.	[10]
	b	Write short note on Gibbs phenomenon.	[10]

.....