

DSP

Q.P. Code : 5056

(3 Hours)

[Total Marks : 80

- N.B. : (1) Question No. 1 is compulsory.
 (2) Attempt any three questions from remaining questions.
 (3) Assume suitable data wherever necessary.

1. (a) State and explain relation between DTFS, DFT and ZT. 4
 (b) Explain the term linear phase & state its importance in digital filters. 4
 (c) What is need of DSP processor when high speed processor are available? 4
 (d) What is meant by limit cycle in IIR system. Give example. 4
 (e) Explain different signal processing operations involved in subband coding. 4
2. (a) Design 6th order linear phase LPF with cut of frequency $\pi/2$ using Blackman window function. 10
 (b) Explain Gibb's phenomenon. State its significance in FIR filter design. 10
3. (a) Given $H(S) = \frac{1}{(s+1)(s+3)}$, $T = 2$ seconds Design digital IIR filter using BLT method. Explain Frequency warping in BLT. 10
 (b) A digital system is characterized by difference Equation, $y(n) = 0.9 y(n-1) + x(n)$ Explain the limit cycles generated in the output & determine the deadband of system when input $x(n) = 0$ and $y(n-1) = 12$ 10
4. (a) Compute DFT of sequence $x(n) = \cos\left(\frac{n\pi}{2}\right)$, $N = 4$ using DIF-FFT algorithm 5
 (b) Find IDFT of $x(k) = \{3, (2+j), 1, (2-j)\}$ 5
 (c) Find DTFS of $x(n) = \{0, 1, 2, 3\}$ with period $N = 4$. State time shifting property of DTFS. 10
5. (a) Explain how higher throughput is obtained in DSP using VLIW architecture. 10
 (b) In a recursive system defined by Transfer function. 10

$$H(z) = \frac{1}{(1-0.35z^{-1})(1-0.62z^{-1})}$$

Assume that products are rounded to 4-bits including sign bit and the product range is -1 to 1. Find output roundoff noise power in direct form realization.
6. (a) Explain different addressing modes of TMS320C67XX DSP processor 10
 (b) What are the salient features of TMS320C67XX family of DSP processors. 10