

Time allowed: 3 Hours

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

Max. Marks: 50

x-x-x

1. a. Discuss the memory management of TMS320C5X processor.
b. Compare FIR and IIR filters.
c. State and prove the following properties of z-transform.
i. Shifting
ii Differentiation
d. Explain the relation between the z-transform and DFT.
e. Discuss the effects of finite word length in digital filters?

(5×2)

Section A

2. a. Describe time frequency analysis of signals using wavelet transforms. How increasing frèquency resolution does decreases time resolution.
b. Derive the DFT of the sample data sequence $x(n) = \{1,1\}$ and compute the corresponding amplitude and phase spectrum. (5+5)
3. a. Given $x(n) = \{0,1,2,3,4,5,6,7\}$, find $X(k)$ using DIT FFT algorithm.
b. Determine the causal signal $x(n)$ having the z-transform using partial fraction method
$$X(z) = \frac{1}{(1+z^{-1})(1-z^{-1})^2}$$
 (5+5)
4. Find the response of an FIR filter with impulse response $h(n) = \{1,2,4\}$ to the input sequence $x(n) = \{1,2\}$ using circular convolution. (10)

Section B

5. a. Describe the frequency domain analysis of Decimator. What are the effects of decimation on frequency spectrum of the signal? (5+5)
b. Differentiate the Butterworth and Chebyshev filters.
6. a. Name the different types of window functions. How they are defined?
b. Obtain the cascade realization of the system characterized by the transfer function (5+5)

$$H(z) = \frac{2(z+2)}{z(z-0.1)(z+0.5)(z+0.4)}$$

with $T = 0.1s$.

7. a. Apply bilinear transformation to $H(s) = \frac{2}{(s+1)(s+3)}$
b. Explain the architecture of TMS320CXX series processor. Also discuss the different addressing modes. (5+5)

x-x-x